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⑯ Proprietor : NIPPON HOSO KYOKAI
2-1, Jinnan 2-chome
Shibuya-ku
Tokyo 150 (JP)

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⑯ Inventor : Uehara, Toshihiro, c/o NHK Science
and
Technical Research Lab.,
10-11, 1-chome, Kinuta
Setagaya-ku, Tokyo (JP)

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⑯ Inventor : Minaguchi, Hotaka, c/o NHK Science
and
Technical Research Lab.,
10-11, 1-chome, Kinuta
Setagaya-ku, Tokyo (JP)

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⑯ Inventor : Oba, Yoshinobu, c/o NHK Science
and
Technical Research Lab.,
10-11, 1-chome, Kinuta
Setagaya-ku, Tokyo (JP)

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⑯ Representative : Tiedtke, Harro, Dipl.-Ing. et al
Patentanwaltsbüro
Tiedtke-Bühling-Kinne & Partner
Bavarlarling 4
D-80336 München (DE)

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Description

The present invention relates to a digital modulation method which converts 8-bit digital data into 14-bit digital modulation codes.

5 Conventional apparatuses, which use rotary heads to record digital data to magnetic tape or to reproduce digital data recorded on magnetic tape, utilize rotary transformers to record or reproduce the digital data: recording is performed by supplying the digital data to the rotary head through the rotary transformer; and reproduction is performed by reading the digital signal with the rotary magnetic head through the rotary transformer.

10 Consequently, if the reproduced signal includes a DC (Direct Current) component, the digital data cannot be correctly reproduced. For this reason, the digital data must be recorded by using a DC free digital modulation system.

Among the conventional DC free digital modulation systems, the following systems are well known.

15 The 8-10 modulation system, the DR (Density Ratio) of which is 0.8, is described in Japanese Patent Application Laying-Open No. 56-19506.

The M² modulation system, the DR of which is 1, is known.

20 The 8-14 modulation system, the DR of which is 1.14, is described in Japanese Patent Application Laying-Open No. 61-196469. This system provides up to four 14-bit digital modulation codes for each 8-bit digital data. When the CDS (Code word Digital Sum) of a 14-bit modulation code is zero, the code is paired with the reversal pattern thereof. When the CDS of a 14-bit digital modulation code is not zero, the code is grouped with the following three codes: another 14-bit modulation code the absolute value and sign of CDS of which differ from those of the above code; and the reversal patterns of the respective codes.

25 Here, CDS is defined as a DSV calculated from the first bit to the last bit of a modulation code: DSV (Digital Sum Value) is a total sum obtained by adding -1 for respective bits "0" in a series of digital modulation codes and by adding 1 for respective bits "1" in the same codes. The reversal pattern is a pattern obtained by reversing each bit in a code: bit "1" is reversed to "0", whereas bit "0" is reversed to "1".

30 Another digital modulation method for converting 8-bit digital data into 14-bit digital modulation codes is described in Patent Abstracts of Japan, vol. 11, no. 237 (E-528), 4 August 1988. According to that method, the number of consecutive bits in a leading block and in an end block of bits is limited to five or less, and the number 35 of consecutive bits in a middle block of bits is restricted to a range between 2 and 10. The code satisfies the requirement that the digital sum value (DSV) for all bits in the modulation code is equal to or below a predetermined value.

The above-mentioned conventional modulation systems have the following problems.

35 The 8-10 modulation system is not appropriate to a high-density recording because of its low DR of 0.8.

The M² modulation system is restricted in its high density recording because of its DR of 1.

40 The 8-14 modulation system has up to 4 modulation codes for each 8-bit code, and the absolute value of CDS of the digital modulation codes are allowed up to 6. In addition, DSV at the end of each 14-bit digital modulation code in the code stream is allowed up to ± 4 , and DSV at each bit in a series of the 14-bit digital modulation codes is allowed up to ± 9 . Consequently, it is difficult to eliminate the DC component of the modulation 45 codes in a short time, and hence, low frequency component must be adequately passed in a recording/reproducing system including the rotary transformer.

A further problem is presented in the 8-14 modulation system. Generally speaking, magnetizing depth on magnetic tape is about 1/4 of the magnetized wavelength. When recording signals are over-written on the tape, the following problem occurs: recording a new signal of the shortest magnetized wavelength on the longest 50 magnetized wavelength which is 4 times or more longer than the shortest magnetized wavelength results in the erasing residue in the deeper part of the recording medium. This erasing residue appears during reproduction of the new signal, and so the over-writing is practically difficult.

55 Thus, the 8-14 modulation system suffers from the problem caused by the erasing residue when over-writing is performed because the number of consecutive identical bits ("0" or "1") in a 8-14 modulation code train is 2-9.

Incidentally, in the later description, the term "consecutive identical bits" means two or more consecutive identical bits: for example, "000" or "11".

It is therefore an object of the present invention to provide a digital modulation system which can solve the above problems: the digital modulation system that allows high density recording, that can reduce the DC component with high efficiency, and that can perform azimuth recording and over-writing.

55 In a first aspect of the present invention, there is provided a digital modulation method for converting 8-bit digital data into 14-bit digital modulation codes, the digital modulation method comprising:

step 1 for selecting up to four 14-bit digital modulation codes for each 8-bit digital data, the 14-bit digital

modulation code is selected by the procedures of

- (a) selecting among the 2^{14} 14-bit digital codes, a digital code the numbers of consecutive identical bits in which are 5 or less in the first 6 bits, 2 - 7 from the second bit to 13th bit, and 6 or less in the last 7 bits, the absolute value of CDS of the selected digital code being 4 or less, and repeating this selecting procedure,
- (b) selecting among the selected 14-bit digital codes at the procedure (a), a digital code the first bit of which is "0", and the value of CDS of which is 0, and pairing the selected 14-bit digital code with the reversal code thereof to make the 2 digital codes one group, or selecting among the selected 14-bit digital codes at the procedure (a), a digital code the first bit of which is "1", and the value of CDS of which is +2 or +4, combining the selected 14-bit digital codes with the reversal codes thereof, and further combining the two 14-bit digital codes with a pair of 14-bit digital codes selected at the above procedure to make the 4 digital codes one group, and repeating this selecting procedure,
- (c) selecting among the selected 14-bit digital codes at the procedure (a), a digital code the first bit of which is "0", and the value of CDS of which is +2, and another digital code the first bit of which is "1", and the value of CDS of which is +2 or +4, and combining the two selected 14-bit digital codes with the reversal codes thereof to make the 4 digital codes one group, and repeating this selecting procedure,
- (d) selecting among the selected 14-bit digital codes at the procedure (a), a digital code the first bit of which is "0", and the value of CDS of which is +4, and another digital code the first bit of which is "1", and the value of CDS of which is +2, and combining the two selected 14-bit digital codes with the reversal codes thereof to make the 4 digital codes one group, and repeating this selecting procedure, and
- (e) selecting 256 groups among the groups formed in the above procedures as the 14-bit digital modulation codes;

25 step 2 for selecting one group of 14-bit digital modulation codes among the 256 groups of the 14-bit digital modulation codes, the selected group corresponding to inputted 8-bit digital data;

step 3 for further selecting one or more 14-bit digital modulation codes in the selected group at step 2, each of the 14-bit digital modulation codes satisfying the requirement that the number of consecutive identical bits at the joint portion of the preceding 14-bit digital modulation code already selected and the 14-bit digital modulation code to be selected is 2 - 7; and

30 step 4 for further selecting one 14-bit digital modulation code among the selected modulation codes at step 3 so that the one 14-bit digital modulation code satisfies the requirement that the absolute value of the DSV at each bit of the modulation code (called bit DSV hereinafter) is equal to or less than 7.

In a second aspect of the present invention, there is provided a digital modulation method for converting

35 8-bit digital data into 14-bit digital modulation codes, the digital modulation method comprising:

step 1 for selecting up to four 14-bit digital modulation codes for each 8-bit digital data, the 14-bit digital modulation code is selected by the procedures of

- (a) selecting among the 2^{14} 14-bit digital codes, a digital code the numbers of consecutive identical bits in which are 6 or less in the first 7 bits, 2 - 7 from the second bit to 13th bit, and 5 or less in the last 6 bits, and repeating this selecting procedure,
- (b) selecting among the 14-bit digital codes selected at the procedure (a), a digital code the first bit of which is "0", and the CDS of which has the absolute value equal to or less than 6, and repeating this selecting procedure,
- (c) selecting among the 14-bit digital codes selected at the procedure (a), a digital code the first bit of which is "1", and the CDS of which has the absolute value equal to or less than 4, and repeating this selecting procedure,
- (d) selecting among the 14-bit digital codes selected at the procedure (b), a digital code the value of CDS of which is 0, and pairing the selected 14-bit digital code with the reversal code thereof to make the 2 digital codes one group, and repeating this selecting procedure,
- (e) selecting among the 14-bit digital codes selected at the procedure (b), a digital code the value of CDS of which is +2, +4 or +6, selecting among the 14-bit digital codes selected at the procedure (c), a digital code the value of CDS of which is +2 or +4, and combining the two selected 14-bit digital codes with the reversal codes thereof to make the 4 digital codes one group, and repeating this selecting procedure, and
- (f) selecting 256 groups among the groups formed in the above procedures as the 14-bit digital modulation codes;

step 2 for selecting one group of 14-bit digital modulation codes among the 256 groups of the 14-bit digital modulation codes, the selected group corresponding to inputted 8-bit digital data;

step 3 for further selecting one or more 14-bit digital modulation codes in the selected group at step 2, each of the 14-bit digital modulation codes satisfying the requirement that the number of consecutive identical bits at the joint portion of the preceding 14-bit digital modulation code already selected and the 14-bit digital modulation code to be selected is 2 - 7; and

5 step 4 for further selecting one 14-bit digital modulation code among the selected modulation codes at step 3 so that the one 14-bit digital modulation code satisfies the requirement that the absolute value of the bit DSV of the modulation code is equal to or less than 8.

Fig. 1 is a block diagram showing a digital modulation apparatus for carrying out the digital modulation according to the first embodiment of the digital modulation method of the present invention;

10 Fig. 2 is a block diagram showing an embodiment of the decoding circuit;

Fig. 3A is a graph showing a carrier-to-noise ratio of a reproduced signal;

Fig. 3B is a graph showing a power spectrum of the first embodiment of the present invention;

Fig. 3C is a graph showing a power spectrum of the scrambled NRZ;

15 Fig. 4 is a view showing the number of 14-bit digital modulation codes whose CDS ≥ 0 ;

Fig. 5 is a view showing the number of 14-bit digital modulation codes whose CDS ≤ 0 ;

Fig. 6 is a block diagram showing a digital modulation apparatus for carrying out the digital modulation according to the second embodiment of the digital modulation method of the present invention;

Fig. 7 is a flowchart showing the modulation procedure of the digital modulation apparatus for carrying out the digital modulation according to the second embodiment;

20 Fig. 8 is a view showing the number of 14-bit digital modulation codes whose CDS ≥ 0 ; and

Fig. 9 is a view showing the number of 14-bit digital modulation codes whose CDS ≤ 0 .

The invention will now be described with reference to the accompanying drawings.

[A] FIRST EMBODIMENT

25 Fig. 1 is a block diagram showing a digital modulation apparatus for carrying out the digital modulation according to the first embodiment of the digital modulation method of the present invention.

In Fig. 1, 8-bit digital data 1 is converted to a 14-bit digital modulation code by an encoder 2. An end pattern judgement portion 3 converts the end pattern of the last 6-bits of the 14-bit digital modulation code into a 4-bit code in Table 9 (although the last 8 bits of the modulation codes are given in Table 9, only the last 6 bits should be considered). A CDS calculation portion 5 computes the CDS of the 14-bit digital modulation code supplied, and converts the resultant CDS into a 3-bit code in Table 7. A DSV calculation portion 4 adds the CDS of the current 14-bit digital modulation code to the DSV at the end of the preceding 14-bit digital modulation code, yielding a new DSV, and converts the new DSV into a 2-bit code shown in Table 8.

30 35 A parallel-to-serial converter 8 converts the 14-bit digital modulation code into a serial signal in synchronism with a clock signal 9. A recording portion 10 records the serial modulation signal produced from the parallel-to-serial converter 8 on a recording medium such as magnetic tape or the like.

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TABLE 7

	CDS of modulation codes	Corresponding 3-bit codes
10	-4	000
15	-2	001
20	0	010
25	2	011
	4	100

TABLE 8

	DSV at the end of the preceding modulation codes	Corresponding 2-bit codes
30		
35	-2	00
40	0	01
45	2	10

TABLE 9

	End pattern of the preceding modulation code	Corresponding 2-bit codes
10	... xxxx110	0000
15	... xxxx1100	0001
20	... xxx11000	0010
25	... xx110000	0011
30	... x1100000	0100
35	... 11000000	0101
40	... xxxx001	0110
45	... xxxx0011	0111
	... xxx00111	1000
	... xx001111	1001
	... x0011111	1010
	... 00111111	1011

x: Don't care bit

The output code of the CDS calculation portion 5 is supplied to the DSV calculation portion 4.

The DSV calculation portion 4 supplies the code to the encoder 2 via a latch 6. The end pattern judgement portion 3 supplies the code to the encoder 2 via a latch 7.

Next, the method for selecting a 14-bit digital modulation code corresponding to each inputted 8-bit digital data will be described.

First, the method for selecting up to four 14-bit digital modulation codes for each 8-bit digital data will be described. The 14-bit digital modulation code is selected by the procedures of

(a) selecting among the 2^{14} 14-bit digital codes, a digital code the numbers of consecutive identical bits in which are 5 or less in the first 6 bits, 2 - 7 from the second bit to 13th bit, and 6 or less in the last 7 bits, the absolute value of CDS of the selected digital code being 4 or less, and repeating this selecting proce-

dure,

(b) selecting among the selected 14-bit digital codes at the procedure (a), a digital code the first bit of which is "0", and the value of CDS of which is 0, and pairing the selected 14-bit digital code with the reversal code thereof to make the 2 digital codes one group, and repeating this selecting procedure, or selecting among the selected 14-bit digital codes at the procedure (a), a digital code the first bit of which is "1", and the value of CDS of which is +2 or +4, combining the selected 14-bit digital codes with the reversal codes thereof, and further combining the two 14-bit digital codes with a pair of 14-bit digital codes selected at the above procedure to make the 4 digital codes one group, and repeating this selecting procedure,

(c) selecting among the selected 14-bit digital codes at the procedure (a), a digital code the first bit of which is "0", and the value of CDS of which is +2, and another digital code the first bit of which is "1", and the value of CDS of which is +2 or +4, and combining the two selected 14-bit digital codes with the reversal codes thereof to make the 4 digital codes one group, and repeating this selecting procedure,

(d) selecting among the selected 14-bit digital codes at the procedure (a), a digital code the first bit of which is "0", and the value of CDS of which is +4, and another digital code the first bit of which is "1", and the value of CDS of which is +2, and combining the two selected 14-bit digital codes with the reversal codes thereof to make the 4 digital codes one group, and repeating this selecting procedure, and

(e) selecting 256 groups among the groups formed in the above procedures as the 14-bit digital modulation codes.

Next, the selection procedure of a 14-bit digital modulation code (current modulation code) corresponding to inputted 8-bit data will be described.

First, the DSV at the end of the preceding modulation code is calculated, and the end pattern of the preceding modulation code is decided as one of the twelve end patterns shown in Table 9.

Subsequently, the current 14-bit digital modulation code is selected by the encoder 2 in response to the 8-bit data, the DSV at the end of the preceding modulation code, and the end pattern of the preceding modulation code.

More specifically, the following steps are taken for selecting the current 14-bit digital modulation code.

(1) The 14-bit digital modulation codes satisfying the following conditions are selected from Tables 4 and 5: (a) the number of consecutive identical bits at the joint portion with the preceding 14-bit digital modulation code is two to seven; and (b) the absolute value of the DSV at the end of the digital modulation code (called end DSV hereinafter) is equal to or less than two.

(2) When two or more 14-bit digital modulation codes are selected at step (1), the 14-bit digital modulation code that gives the least absolute value of the end DSV is chosen.

(3) When two or more 14-bit digital modulation codes are still chosen in step (2), the 14-bit digital modulation code is selected by calculating the bit DSV of the modulation code, determining the bit DSV the absolute value of which is minimum for each modulation code, and choosing the code including the bit DSV whose minimum absolute value is minimum.

(4) When two or more 14-bit digital modulation codes are further found in step (3), the 14-bit digital modulation code is selected by finding the maximum absolute value of the bit DSV of each modulation code, and choosing the code including the bit DSV whose maximum absolute value is equal to or less than six.

(5) When two or more modulation code are still found in step (4), is selected the 14-bit digital modulation code satisfying the condition that the number of consecutive identical bits at the joint portion with the preceding 14-bit digital modulation code is equal to or less than six.

(6) When any modulation codes selected at step (4) does not satisfy step (5), or two or more modulation codes satisfy step (5), is selected a 14-bit digital modulation code satisfying the condition that the consecutive identical bits in that modulation code is equal to or less than six.

(7) When any modulation code selected at step (4) does not satisfy steps (5) and (6), or when any modulation code selected at step (5) does not satisfy step (6), or when two or more modulation codes are further found at step (6), the following steps are taken.

(7a) When the end DSV of the modulation code is -2, the code of higher priority (corresponding to smaller number in Table 10) is selected according to Table 10. Likewise, when the end DSV of the modulation code is +2, the code of higher priority is selected according to Table 11.

(7b) When two or more modulation codes belonging to the equal highest priority are found in step (7a), all of them are temporarily selected. When the end DSV is zero, is selected the modulation code satisfying the last six bits of which are not "...111111", nor "...000000" in the modulation codes.

(8) When any modulation code selected at step (4) does not satisfy steps (5), (6) and (7), or when any modulation code selected at step (5) does not satisfy step (6) and (7), or when any modulation code selected at step (6) does not satisfy step (7), or when two or more modulation codes are further found at step (7), is selected the modulation code including the bit DSV whose maximum absolute value is minimum.

(9) When two or more modulation codes are still found at step (8), is selected the modulation code including the bit DSV whose minimum absolute value appears fastest in the bit string of the modulation code.

(10) When two or more modulation codes are further found at step (9), is selected the modulation code whose bit will be reversed fastest after the joint point with the preceding modulation code.

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TABLE 10

10 In the case where DSV at the end of modulation code is "-2"

	End pattern of modulation codes	Priority
15	... xxxx001	4
20	... xxxx0011	1
25	... xxx00111	2
30	... xx001111	3
35	... x0011111	8
40	... xxxx110	10
45	... xxxx1100	5
50	... xxx11000	6
	... xx110000	7
	... x1100000	9
	... 11000000	11

x: Don't care bit

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TABLE 11

5 In the case where DSV at the end of modulation
code is "+2"

10	End pattern of modulation codes	Priority
15	... xxxx110	4
20	... xxxx1100	1
25	... xxx11000	2
30	... xx110000	3
35	... x1100000	8
40	... xxxx001	10
45	... xxxx0011	5
	... xxx00111	6
	... xx001111	7
	... x0011111	9
	... 00111111	11

x: Don't care bit

50 The 14-bit digital modulation code thus selected is fed to the parallel-to-serial converter 8. The modulation code entered the parallel-to-serial converter 8 is serially read out in synchronism with the clock 9, and is fed to the recording portion 10, where the 14-bit digital modulation code is recorded on the recording medium such as magnetic tape or the like.

55 On the other hand, the 14-bit digital modulation code selected by the encoder 2 is supplied to the DSV calculation portion 4, and to the end pattern judgement portion 3. The DSV calculation portion 4 adds the CDS of the current modulation code to the DSV at the end of the preceding modulation code to obtain a new DSV. The new DSV is converted into a 2-bit code according to Table 8, and is supplied to the encoder 2 through latch 6. The end pattern judgement portion 3 converts the last 6 bits of the 14-bit modulation code into a 4-bit code according to Table 9, and supplies the 4-bit code to the encoder 2 through latch 7.

The above procedure is repeated for every 8-bit input data. Thus, a 14-bit digital modulation code train is obtained, in which the number of consecutive identical bits is restricted to 2 - 7, and the absolute value of the

DSV is restricted equal to or less than 7.

Fig. 2 shows an example of the decoding circuit. In Fig. 2, reference numeral 11 designates a reproducing portion, 12 designates a synchronizing signal detector, 13 denotes a serial-to-parallel converter, and 14 denotes a decoder. The decoding procedure by the decoding circuit will now be described.

The serial modulation code reproduced by the reproducing portion 11 is supplied to the synchronizing signal detector 12 and the serial-to-parallel converter 13. The synchronizing signal detector 12 detects the synchronizing signal inserted at the beginning of the synchronizing block, and supplies it to the parallel-to-serial portion 13. The synchronizing signal is used to synchronize with each 14-bit digital modulation code. The serial-to-parallel converter 13, using the synchronizing signal from the synchronizing signal detector 12, converts the serial 14-bit digital modulation code to a parallel 14-bit digital modulation code, and supplies it to the decoder 14. The decoder 14 decodes the 14-bit digital modulation code into corresponding 8-bit data by using a ROM.

Next, the 14-bit digital modulation code produced from the encoder 2 in Fig. 1 will be described.

The 14-bit digital modulation code converted from the 8-bit code satisfies the following requirements.

- (1) The number of consecutive identical bits in the first 6 bits is equal to or less than 5.
- (2) The number of consecutive identical bits included from the second bit to the 13th bit is 2 - 7.
- (3) The number of consecutive identical bits included in the last 7 bits is equal to or less than 6.
- (4) The absolute value of CDS of the modulation code is equal to or less than 4.

The end patterns of the modulation codes that satisfy the above requirements (1) to (4) are summed up as the following 12 items (A) - (M).

	(A)	...	...	...	110
25	(B)	...	...	...	1100
	(C)	...	...	...	11000
	(D)	...	...	...	110000
30	(E)	...	...	...	1100000
	(F)	...	...	...	11000000
	(G)	...	...	...	001
	(H)	...	...	...	0011
35	(J)	...	...	...	00111
	(K)	...	...	...	001111
	(L)	...	...	...	0011111
40	(M)	...	...	...	00111111

The beginning of the modulation code succeeding to the modulation codes (A) - (M) is one of the following items.

First, the beginning of the modulation code succeeding to the modulation code (A) is one of the following five items (A1) - (A5).

50	(A1)	011	...	...	...	...
	(A2)	0011	...	...	...	...
	(A3)	00011	...	...	...	...
	(A4)	000011	...	...	...	...
55	(A5)	0000011	...	...	...	...

Second, the beginning of the modulation code succeeding to the modulation code (B) is one of the following nine items (B1) - (B9).

```
(B1) 011 ...
(B2) 0011...
(B3) 00011 ...
(B4) 000011 ...
(B5) 0000011 ...
(B6) 1100...
(B7) 11100 ...
(B8) 111100 ...
(B9) 1111100 ...
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15 The beginning of the modulation code succeeding to the modulation code (C) is one of the following eight items (C1) - (C8) .

20	(C1) 011
	(C2) 0011...
	(C3) 00011
25	(C4) 000011
	(C5) 1100...
	(C6) 11100
	(C7) 111100
30	(C8) 1111100

The beginning of the modulation code succeeding to the modulation code (D) is one of the following seven items (D1) - (D7).

35 (D1) 011
(D2) 0011...
(D3) 00011

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45 (D4) 1100...
(D5) 11100
(D6) 111100
(D7) 1111100

50 The beginning of the modulation code succeeding to the modulation code (E) is one of the following six items (E1) - (E6).

- (E1) 011
- (E2) 0011...
- (E3) 1100...
- (E4) 11100
- (E5) 111100
- (E6) 1111100 ...

The beginning of the modulation code succeeding to the modulation code (F) is one of the following five items (F1) - (F5).

(F1) 011
(F2) 1100
(F3) 11100
(F4) 111100
(F5) 1111100

25 The beginning of the modulation code succeeding to the modulation code (G) is one of the reversal patterns of the modulation codes (A1) - (A5).

The beginning of the modulation code succeeding to the modulation code (H) is one of the reversal patterns of the modulation codes (B1) - (B9).

The beginning of the modulation code succeeding to the modulation code (J) is one of the reversal patterns of the modulation codes (C1) - (C8).

30 The beginning of the modulation code succeeding to the modulation code (K) is one of the reversal patterns of the modulation codes (D1) - (D7).

The beginning of the modulation code succeeding to the modulation code (L) is one of the reversal patterns of the modulation codes (E1) - (E6).

35 The beginning of the modulation code succeeding to the modulation code (M) is one of the reversal patterns of the modulation codes (F1) - (F5).

The numbers of the modulation codes that satisfy the requirements (1) - (4) are shown in Tables 1 and 2. The code "10000000111111" (CDS = 0), and the code "0111111000000" (CDS = 0) are excluded from the numbers.

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TABLE 1

Beginning pattern of modulation codes	The number of possible modulation codes							
	CDS Value							
	-4	-2	0	2	4	Total	CDS ≤ 0	CDS ≥ 0
0000011.....	9	8	6	0	0	23	23	6
000011.....	12	14	10	6	0	42	36	16
00011.....	15	21	20	11	5	72	56	36
0011.....	17	29	33	26	11	116	79	70
011.....	17	37	49	47	32	182	103	128
Total	70	109	118	90	48	435	297	256

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TABLE 2

Beginning pattern of modulation codes	The number of possible modulation codes							
	CDS Value						CDS ≤ 0	CDS ≥ 0
	-4	-2	0	2	4	Total		
11111100.....	0	0	6	8	9	23	6	23
1111100.....	0	6	10	14	12	42	16	36
11100.....	5	11	20	21	15	72	36	56
1100.....	11	26	33	29	17	116	70	79
100.....	32	47	49	37	17	182	128	103
Total	48	90	118	109	70	435	256	297

More than 256 modulation codes whose $CDS \geq 0$, and more than 256 modulation codes whose $CDS \leq 0$ are necessary, which follow one of the modulation codes (A) - (M). In addition, the converted modulation code must correspond to one 8-bit data to avoid transmission error.

The number of modulation codes that can succeed one of the modulation codes (A) - (M) is shown in Table 3.

For example, the CDS of the modulation codes that terminate with "...00111111" is "2" or "4". Accordingly, the end DSV of the modulation code takes a value of "0" or "2", and so the succeeding modulation code must satisfy the requirements that its $CDS \leq 0$, and it must begin with any one of the bit train "0000011", "000011", "00011", "0011", and "100". The number of the modulation codes that satisfy the requirements are 322 as shown in Table 3, which is greater than the necessary number of 256.

Likewise, the CDS of the modulation codes that terminate with "...11000000" is "-2" or "-4". Accordingly, the end DSV of the modulation code takes a value of "0" or "-2", and so the succeeding modulation code must satisfy the requirements that its $CDS \geq 0$, and it must begin with any one of the bit train "1111100", "111100", "11100", "1100", and "011". The number of the modulation codes that satisfy the requirements are 322 as shown in Table 3, which is greater than the necessary number of 256.

TABLE 3

End pattern of modulation codes	The number of possible successive modulation codes							
	CDS Value							
	-4	-2	0	2	4	Total	CDS ≤ 0	CDS ≥ 0
.....110	70	109	118	90	48	435	297	256
.....1100	86	152	187	162	101	688	425	450
.....11000	77	144	181	162	101	665	402	444
.....110000	65	130	171	156	101	623	366	428
...1100000	50	109	151	145	96	551	310	392
..11000000	33	80	118	119	85	435	231	322
.....001	48	90	118	109	70	435	256	297
.....0011	101	162	187	152	86	688	450	425
.....00111	101	162	181	144	77	665	444	402
.....001111	101	156	171	130	65	623	428	366
....0011111	96	145	156	109	50	550	392	310
...00111111	85	119	118	80	33	435	322	231

Fig. 4 shows the number of modulation codes of respective classes when $CDS \geq 0$, and Fig. 5 shows the number of modulation code of respective classes when $CDS \leq 0$.

Tables 4 and 5 show the correspondence between the 8-bit data and the modulation codes: Table 4 shows the correspondence when $CDS \geq 0$; and Table 5 shows the correspondence when $CDS \leq 0$.

Table 4 (CDS ≥ 0)

Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	0	01111110000001	0		0	10000001111110	0
	1	01111100110000	0		1	10000011001111	0
	2	01111100011000	0		2	10000011100111	0
	3	01111100001100	0		3	10000011110011	0
	4	01111100000110	0		4	10000011111001	0
	5	01111100000011	0		5	10000011111100	0
10	6	01111100111000	0		6	10000110001111	0
	7	01111100110001	0		7	10000110011110	0
	8	01111100011100	0		8	10000111000111	0
	9	01111100011001	0		9	10000111001110	0
	10	011111000011100	0		10	10000111100011	0
	11	011111000011001	0		11	10000111100010	0
15	12	011111000001110	0		12	10000111110001	0
	13	011111000000111	0		13	10000111111000	0
	14	01110011111000	0		14	10001100001111	0
	15	01110011100001	0		15	10001100011110	0
	16	01110011001100	0		16	10001100110011	0
	17	01110011000110	0		17	10001100111001	0
20	18	01110011000011	0		18	10001100111100	0
	19	01110001111000	0		19	10001110000111	0
	20	01110001110001	0		20	10001110001110	0
	21	01110001100010	0		21	10001110011001	0
	22	01110001100011	0		22	10001110011100	0
	23	01110000111100	0		23	10001111000011	0
25	24	01110000111001	0		24	10001111000110	0
	25	01110000110011	0		25	10001111001100	0
	26	01110000011110	0		26	10001111100001	0
	27	01110000001111	0		27	10001111110000	0
	28	01100111111000	0		28	10011000001111	0
	29	01100111100001	0		29	10011000011110	0
	30	01100111001100	0		30	10011000110011	0
30	31	01100111000110	0		31	10011000111001	0
	32	01100111000011	0		32	10011000111100	0
	33	01100110011100	0	1(B)	33	10011001100011	0
35	34	01100110011001	0		34	10011001100110	0
	35	01100110001110	0		35	10011001110001	0
	36	01100110000111	0		36	10011001111000	0
35	37	01100011111000	0		37	10011100000111	0
	38	01100011110001	0		38	10011100001110	0
	39	01100011100110	0		39	10011100011001	0
	40	01100011100011	0		40	10011100011100	0
	41	01100011001110	0		41	10011100110001	0
	42	01100011000111	0		42	10011100111000	0
40	43	01100001111100	0		43	10011110000011	0
	44	01100001111001	0		44	10011110000110	0
	45	01100001100011	0		45	10011110001100	0
	46	01100001100111	0		46	10011110011000	0
	47	01100000111110	0		47	10011111000001	0
	48	01100000011111	0		48	10011111100000	0
	49	01111111001100	4		49	10000011111110	2
45	50	01111111000110	4		50	10000110011111	2
	51	01111111000011	4		51	10000111001111	2
	52	011111110011100	4		52	10000111100111	2
	53	011111110011001	4		53	10000111110011	2
	54	011111110001110	4		54	10000111111001	2
50	55	011111110000111	4		55	10000111111100	2
	56	011111100111100	4		56	10001100011111	2
	57	011111100111001	4		57	10001100111110	2
	58	011111100110011	4		58	10001110001111	2
	59	011111100011110	4		59	10001110011110	2
	60	011111100001111	4		60	10001111000111	2
	61	011111001111100	4		61	100011111001110	2
55	62	011111001111001	4		62	100011111100011	2
	63	011111001110011	4		63	100011111100110	2

Table 4 (CDS ≥ 0)

Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	64	011110011001111	6		64	10001111110001	2
	65	011110001111110	6		65	10001111111000	2
	66	011110000111111	6		66	100110000111111	2
	67	011100111111100	6		67	100110001111110	2
10	68	011100111111001	6		68	100110011001111	2
	69	0111001111110011	6		69	100110011100111	2
	70	011100110011111	6		70	10011001111001	2
	71	011100110011111	6		71	10011001111100	2
	72	011100011111110	6		72	100111000011111	2
	73	011100001111111	6		73	100111000111110	2
15	74	011001111111100	6		74	100111001100111	2
	75	0110011111111001	6		75	100111001111001	2
	76	0110011111110011	6		76	100111001111100	2
	77	011001111100111	6		77	100111100001111	2
	78	0110011111001111	6		78	100111100011110	2
	79	011001100111111	6	1(B)	79	100111100111001	2
20	80	011000111111110	4		80	100111100111100	2
	81	011111110000001	2		81	100111110000011	2
	82	011111110011000	2		82	100111110001100	2
	83	011111110011100	2		83	100111110011000	2
	84	011111110000010	2		84	100111110000011	2
	85	011111110000011	2		85	100111110000000	2
	86	011111100111100	2		86	100011111001111	4
25	87	011111100110001	2		87	100011111001111	4
	88	011111100011100	2		88	100011111100111	4
	89	011111100011001	2		89	10011001111110	4
	90	011111100001110	2		90	10011100111110	4
	91	011111000001111	2		91	100111100011111	4
	92	011111001111100	2		92	100111110011110	4
	93	011111001110001	2		93	100111110001111	4
30	94	011111001100110	2		94	100111110011110	4
	95	011111001100011	2		95	100111111000111	4
	96	011111000111100	2		96	100111111001110	4
	97	011111000111001	2		97	110001111100111	4
35	98	011111000110011	2		98	110001111100111	4
	99	011111000011110	2		99	110000001111111	2
	100	011111000001111	2		100	110000011111110	2
	101	011100111111000	2		101	110000110011111	2
	102	011100111110001	2		102	110000111100111	2
	103	011100111001110	2		103	110000111100111	2
	104	011100111000011	2		104	110000111111001	2
	105	011100110011110	2		105	1100001111111100	2
40	106	011100110001111	2		106	110001100011111	2
	107	011100011111100	2		107	110001100111110	2
	108	011100011110001	2	2(B)	108	110001111000111	2
	109	011100011110011	2		109	1100011110011110	2
	110	011100011001111	2		110	110001111100011	2
	111	011100001111110	2		111	1100011111000110	2
45	112	011100001111111	2		112	110001111110001	2
	113	011001111111000	2		113	110001111111000	2
	114	011001111110001	2		114	110011000011111	2
	115	011001111100110	2		115	110011000111110	2
	116	011001111100011	2		116	110011001100111	2
	117	011001110011110	2		117	110011001111001	2
	118	011001110001111	2		118	110011001111100	2
50	119	011001110011110	2		119	110011110000111	2
	120	011001110001111	2		120	1100111100011110	2
	121	011000111111100	2		121	110011110011001	2
	122	011000111111001	2		122	1100111100111100	2
	123	011000111100111	2		123	110011110000011	2
	124	011000111001111	2		124	110011110001110	2
55	125	011000110011111	2		125	1100111110011100	2
	126	011000011111110	2		126	110011111100001	2
	127	011000011111111	2		127	110011111110000	2

Table 4 (CDS ≥ 0)

Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	128	0011111100000	0		128	11000000011111	0
	129	00111111000001	0		129	11000000111110	0
	130	001111110011000	0		130	110000001100111	0
10	131	001111110001100	0		131	110000001110011	0
	132	001111110000110	0		132	110000001111001	0
	133	001111110000011	0		133	110000001111100	0
15	134	001111100111000	0		134	110000110001111	0
	135	001111100110001	0		135	110000110011110	0
	136	001111100011100	0		136	110000111100011	0
	137	001111100011001	0		137	110000111100110	0
	138	001111100001110	0		138	110000111110001	0
	139	001111100000111	0		139	110000111110000	0
20	140	00111001111000	0		140	110001100001111	0
	141	001110011110001	0		141	11000110001110	0
	142	00111001100110	0		142	11000110011001	0
	143	001110011000111	0	2(B)	143	110001100111100	0
	144	00111000111100	0		144	110001110000111	0
	145	001110001111001	0		145	110001110001110	0
25	146	001110001100111	0		146	11000111001100	0
	147	00111000011110	0		147	11000111100001	0
	148	00111000001111	0		148	11000111110000	0
	149	00110011111000	0		149	110011000001111	0
30	150	001100111110001	0		150	11001100001110	0
	151	00110011100110	0		151	11001100011001	0
	152	001100111000111	0		152	11001100011100	0
	153	00110011001110	0		153	11001100110001	0
	154	001100110001111	0		154	11001100111000	0
	155	00110001111100	0		155	110011100000011	0
	156	001100011111001	0		156	11001110000110	0
	157	00110001110011	0		157	11001110001100	0
35	158	001100011001111	0		158	110011100110000	0
	159	00110000111110	0		159	110011110000001	0
	160	001100000111111	0		160	110011111000000	0
	161	001111111000001	2		161	110011100111110	4
	162	001111110001100	2		162	110011100111110	4
	163	00111111000110	2		163	11001111000111	4
	164	001111111000011	2		164	110011111001110	4
	165	001111110011100	2		165	110011111100011	4
	166	001111110011001	2		166	110011111100110	4
40	167	00111110001110	2		167	11100001111110	4
	168	001111110000111	2		168	111000111100111	4
	169	001111100111100	2		169	111000111110011	4
	170	001111100111001	2		170	111000111111100	4
	171	001111100110011	2		171	111001100111110	4
	172	001111100011110	2	3(B)	172	111001111000111	4
	173	001111100011111	2		173	111001111001110	4
	174	001111001111100	2		174	111001111100011	4
	175	0011110011111001	2		175	111001111100110	4
	176	0011110011110011	2		176	111001111111000	4
45	177	001111001100111	2		177	111000001111111	2
	178	00111000111110	2		178	11100001111110	2
	179	001110000111111	2		179	111000011001111	2
	180	001100111111100	2		180	111000011100111	2
	181	001100111111001	2		181	111000011111001	2
	182	001100111100111	2		182	111000011111100	2
	183	001100111001111	2		183	111000110001111	2
	184	001100110011111	2		184	111000110011110	2
	185	00110001111110	2		185	111000111000111	2
	186	001100011111111	2		186	111000111001110	2
	187	00111111100110	4		187	111000111110001	2
	188	001111111000111	4		188	1110001111111000	2
	189	001111111001110	4		189	111001100011111	2
55	190	001111110001111	4		190	111001100011110	2
	191	001111110011110	4		191	11100110011001	2

Table 4 (CDS ≥ 0)

Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
2 (A)	192	00111110001111	4	3 (B)	192	11100110011100	2
	193	00111100111110	4		193	11100111000011	2
	194	00111100011111	4		194	11100111000110	2
	195	00111001111110	4		195	11100111001100	2
	196	00111000111111	4		196	11100111100001	2
	197	00110011111110	4		197	11100111110000	2
3 (A)	198	0001111110000	0	4 (B)	198	11100000001111	0
	199	0001111100001	0		199	11100000011110	0
	200	00011111001100	0		200	11100000110011	0
	201	00011111000110	0		201	11100000111001	0
	202	00011111000011	0		202	11100000111100	0
	203	00011110011100	0		203	11100001100011	0
	204	00011110011001	0		204	11100001100110	0
	205	00011110001110	0		205	11100001110001	0
	206	00011110000111	0		206	11100001111000	0
	207	000111000111100	0		207	11100011000011	0
	208	00011100011001	0		208	11100011000110	0
	209	000111000110011	0		209	11100011001100	0
	210	00011100011110	0		210	11100011100001	0
	211	00011100001111	0		211	11100011110000	0
	212	00011001111100	0		212	11100110000011	0
4 (A)	213	00011001111001	0		213	11100110000110	0
	214	00011001110011	0		214	11100110001100	0
	215	00011001100111	0		215	11100110011000	0
	216	00011000111110	0		216	11100111000001	0
	217	00011000011111	0		217	11100111100000	0
5 (A)	218	0001111110001	2	5 (B)	218	11110001111100	4
	219	0001111100110	2		219	11110011111000	4
	220	0001111100011	2		220	11110000001111	2
	221	00011111001110	2		221	11110000011110	2
	222	00011111000111	2		222	111100000110011	2
	223	00011100011110	2		223	111100000111001	2
	224	00011100011111	2		224	1111000001111100	2
	225	000111000111110	2		225	111100001100011	2
	226	000111000011111	2		226	111100001100110	2
	227	00011001111110	2		227	111100001110001	2
	228	000110001111111	2		228	1111000011111000	2
	229	00011111100111	4		229	11110011000011	2
	230	000111111001111	4		230	11110011000110	2
	231	0001111110011111	4		231	11110011001100	2
	232	0001111100111111	4		232	11110011100001	2
	233	000111001111111	4		233	11110011110000	2
4 (A)	234	00001111111100	0	5 (B)	234	11110000000111	0
	235	00001111111001	0		235	111100000001110	0
	236	000011111100110	0		236	111100000011001	0
	237	000011111100011	0		237	111100000011100	0
	238	000011111001110	0		238	111100000110001	0
	239	000011111000111	0		239	111100000111000	0
	240	000011110011110	0		240	111100001100001	0
	241	000011110001111	0		241	111100001110000	0
	242	000011000111110	0		242	111100011000001	0
	243	000011000011111	0		243	111100011100000	0
5 (A)	244	000011111111001	2	5 (B)	244	111110000000111	2
	245	000011111100111	2		245	111110000001110	2
	246	000011111001111	2		246	111110000011001	2
	247	000011110011111	2		247	111110000011100	2
	248	000011100111111	2		248	111110001110000	2
	249	0000110001111111	2		249	1111100011100000	2
5 (A)	250	000001111111100	0	5 (B)	250	111110000000011	0
	251	0000011111111001	0		251	1111100000000110	0
	252	000001111100011	0		252	111110000001100	0
	253	000001111000111	0		253	111110000011000	0
	254	0000011100011111	0		254	111110000110000	0
	255	0000011001111111	0		255	1111100011000000	0

Table 5 (CDS ≤ 0)

Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	0	01111110000001	0		0	10000001111110	0
	1	01111100110000	0		1	10000011001111	0
	2	01111100011000	0		2	10000011100111	0
	3	01111100001100	0		3	10000011110011	0
	4	01111100000110	0		4	10000011111001	0
	5	01111100000011	0		5	10000011111100	0
10	6	01111001110000	0		6	10000110001111	0
	7	01111001100001	0		7	10000110011110	0
	8	01111000111000	0		8	10000111000111	0
	9	01111000110001	0		9	10000111001110	0
	10	01111000011100	0		10	10000111100011	0
	11	01111000011001	0		11	10000111100110	0
15	12	01111000001110	0		12	10000111110001	0
	13	01111000000111	0		13	10000111111000	0
	14	01110011110000	0		14	10001100001111	0
	15	01110011100001	0		15	10001100011110	0
	16	01110011001100	0		16	10001100110011	0
	17	01110011000110	0		17	10001100111001	0
	18	01110011000011	0		18	10001100111100	0
20	19	01110001111000	0		19	10001110000111	0
	20	01110001110001	0		20	10001110001110	0
	21	01110001100110	0		21	10001110011001	0
	22	01110001100011	0		22	10001110011100	0
	23	01110000111100	0		23	10001111000011	0
	24	01110000111001	0		24	10001111000110	0
25	25	01110000110011	0		25	10001111001100	0
	26	01110000011110	0		26	10001111100001	0
	27	01110000001111	0		27	10001111110000	0
	28	01100111110000	0		28	10011000001111	0
	29	01100111100001	0		29	10011000011110	0
	30	01100111001100	0		30	10011000110011	0
30	31	01100111000110	0		31	10011000111001	0
	32	01100111000011	0		32	10011000111100	0
	33	01100110011100	0		33	10011001100011	0
35	34	01100110011001	0	1(D)	34	10011001100110	0
	35	01100110001110	0		35	10011001110001	0
	36	01100110000111	0		36	10011001111000	0
	37	01100011110000	0		37	10011100001111	0
	38	01100011110001	0		38	10011100001110	0
	39	01100011100110	0		39	10011100011001	0
	40	01100011100011	0		40	10011100011100	0
	41	01100011001110	0		41	10011100110001	0
	42	01100011000111	0		42	10011100111000	0
40	43	01100001111100	0		43	10011110000011	0
	44	01100001111001	0		44	10011110000110	0
	45	01100001100011	0		45	10011110001100	0
	46	01100001100111	0		46	10011110011000	0
	47	01100000111110	0		47	10011111000001	0
	48	01100000011111	0		48	10011111100000	0
	49	01111100000001	-2		49	10000000110011	-4
45	50	01111001100000	-2		50	10000000111001	-4
	51	01111000110000	-2		51	10000000111100	-4
	52	01111000011000	-2		52	10000000110001	-4
	53	01111000001100	-2		53	10000000110010	-4
	54	01111000000110	-2		54	100000001110001	-4
	55	01111000000011	-2		55	100000001111000	-4
50	56	01110011110000	-2		56	100000011000011	-4
	57	01110011000001	-2		57	100000011000110	-4
	58	01110001110000	-2		58	100000011001100	-4
	59	01110001100001	-2		59	100000011100001	-4
	60	01110000111000	-2		60	100000011110000	-4
	61	01110000110001	-2		61	10000110000011	-4
55	62	01110000011100	-2		62	10000110000110	-4
	63	01110000011001	-2		63	10000110001100	-4

Table 5 (CDS ≤ 0)

Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	64	01110000001110	-2		64	10000110011000	-4
	65	01110000000111	-2		65	10000111000001	-4
	66	0110011100000	-2		66	10000111100000	-4
	67	01100111000001	-2		67	10001100000011	-4
	68	01100110011000	-2		68	100011000000110	-4
	69	01100110001100	-2		69	10001100001100	-4
10	70	01100110000110	-2		70	10001100011000	-4
	71	01100110000111	-2		71	10001100110000	-4
	72	01100011110000	-2		72	10001110000001	-4
	73	01100011100001	-2		73	10001111000000	-4
	74	01100011001100	-2		74	10011000000011	-4
	75	01100011000110	-2		75	100110000000110	-4
15	76	01100011000011	-2		76	10011000001100	-4
	77	01100001111000	-2		77	10011000011000	-4
	78	01100001110001	-2		78	10011000110000	-4
	79	01100001100110	-2		79	10011001100000	-4
	80	01100001100011	-2		80	10011100000001	-4
	81	01100001111100	-2		81	10000000111110	-2
20	82	01100001110001	-2		82	10000001100111	-2
	83	01100000110011	-2		83	10000001110011	-2
	84	01100000011110	-2		84	10000001111001	-2
	85	01100000001111	-2		85	10000001111100	-2
	86	01110000110000	-4		86	10000011000111	-2
	87	01110000011000	-4		87	10000011001110	-2
	88	01110000001100	-4		88	10000011100011	-2
25	89	01100110000001	-4		89	10000011100110	-2
	90	01100011000001	-4		90	10000011110001	-2
	91	01100001111000	-4		91	10000011111000	-2
	92	01100001100001	-4		92	10000110000111	-2
	93	01100000111000	-4		93	10000110001110	-2
	94	01100000110001	-4		94	10000110011001	-2
30	95	01100000011100	-4		95	10000110011100	-2
	96	01100000011001	-4		96	10000111000011	-2
	97	00111000011000	-4	1(D)	97	10000111000110	-2
	98	00111000001100	-4		98	10000111001100	-2
	99	00111111000000	-2		99	10000111100001	-2
35	100	00111110000001	-2		100	10000111110000	-2
	101	00111110011000	-2		101	10001100000111	-2
	102	00111110001100	-2		102	10001100001110	-2
	103	001111100001100	-2		103	10001100011001	-2
	104	001111100000110	-2		104	10001100011100	-2
	105	001111100000011	-2		105	10001100110001	-2
	106	001111000111000	-2		106	10001100111000	-2
	107	00111000110001	-2		107	10001110000011	-2
40	108	001110000111000	-2		108	10001110000110	-2
	109	001110000110001	-2		109	10001110001100	-2
	110	001110000011100	-2		110	10001110011000	-2
	111	00111000011001	-2		111	10001111000001	-2
	112	00111000001110	-2		112	10001111100000	-2
45	113	00111000000111	-2		113	10011000000111	-2
	114	00110011110000	-2		114	10011000001110	-2
	115	00110011100001	-2		115	10011000011001	-2
	116	001100110001100	-2		116	10011000011100	-2
	117	001100110000110	-2		117	10011000110001	-2
	118	001100110000011	-2		118	10011000111000	-2
	119	00110001111000	-2		119	10011001100001	-2
	120	00110001110001	-2		120	10011001110000	-2
50	121	001100011000110	-2		121	10011100000011	-2
	122	001100011000011	-2		122	100111000000110	-2
	123	00110000111100	-2		123	10011100001100	-2
	124	001100001110001	-2		124	100111000011000	-2
	125	001100000110011	-2		125	100111000110000	-2
	126	00110000011110	-2		126	10011110000001	-2
55	127	001100000011111	-2		127	10011111000000	-2

Table 5 (CDS ≤ 0)

Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	128	0011111100000	0	2(C)	128	110000000111111	0
	129	00111111000001	0		129	110000000111110	0
	130	00111110011000	0		130	110000001100111	0
	131	00111110001100	0		131	110000001110011	0
	132	00111110000110	0		132	110000001111001	0
	133	00111110000111	0		133	110000001111100	0
	134	00111100111000	0		134	110000011000111	0
	135	00111100110001	0		135	110000011001110	0
	136	00111100011100	0		136	110000011100011	0
	137	00111100011001	0		137	110000011100110	0
	138	00111100001110	0		138	110000011110001	0
	139	00111100000111	0		139	110000011111000	0
	140	001111001111000	0		140	11000110000111	0
	141	00111001100001	0		141	11000110001110	0
	142	00111001100110	0		142	11000110011001	0
	143	00111001100011	0		143	11000110011100	0
	144	00111000111100	0		144	110001110000111	0
	145	00111000111001	0		145	110001110001110	0
	146	00111000110011	0		146	110001110001100	0
20	147	00111000011110	0		147	11000111100001	0
	148	00111000001111	0		148	11000111110000	0
	149	00110011111000	0		149	110011000001111	0
	150	001100111110001	0		150	11001100001110	0
	151	00110011100110	0		151	11001100011001	0
	152	00110011100011	0		152	11001100011100	0
	153	00110011001110	0		153	11001100110001	0
	154	001100011000111	0		154	11001100111000	0
	155	0011000111100	0		155	110011100000111	0
	156	00110001111001	0		156	11001110000110	0
30	157	00110001110011	0		157	11001110001100	0
	158	00110001100111	0		158	11001110011000	0
	159	00110000111110	0		159	11001111000001	0
	160	00110000011111	0		160	11001111100000	0
	161	00110011000001	-4	2(D)	161	11000000011110	-2
	162	00110001100001	-4		162	110000000110011	-2
	163	00110000011100	-4		163	110000000111001	-2
	164	001100000110001	-4		164	110000000111100	-2
	165	00110000011100	-4		165	1100000001100011	-2
	166	00110000011001	-4		166	1100000001100110	-2
35	167	00011110000001	-4		167	1100000001110001	-2
	168	00011100011000	-4		168	1100000001111000	-2
	169	00011100001100	-4		169	110000011000011	-2
	170	000111000000111	-4		170	1100000110000110	-2
	171	00011001100001	-4		171	110000011001100	-2
	172	000110000111000	-4		172	110000011100001	-2
	173	000110000110001	-4		173	110000011110000	-2
	174	000110000011100	-4		174	1100000110000011	-2
	175	000110000011001	-4		175	1100000110000110	-2
	176	000110000001111	-4		176	11000001100001100	-2
	177	0001111100000	-2		177	11000110011000	-2
	178	00011110000001	-2		178	11000111000001	-2
	179	00011110011000	-2		179	11000111100000	-2
	180	00011110001100	-2		180	110011000000111	-2
	181	00011110000110	-2		181	11001100000110	-2
45	182	000111100000011	-2		182	110011000001100	-2
	183	000111000111000	-2		183	110011000011000	-2
	184	000111000110001	-2		184	110011000110000	-2
	185	000111000011100	-2		185	11001110000001	-2
	186	000111000011001	-2		186	11001110000000	-2
	187	000111000001110	-2		187	110000000011001	-4
	188	0001110000001111	-2		188	110000000011100	-4
	189	00011001111000	-2		189	1100000000110001	-4
	190	00011001110001	-2		190	1100000000111000	-4
	191	00011001100110	-2		191	1100000001100001	-4

Table 5 (CDS ≤ 0)

Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	192	00011001100011	-2	2 (D)	192	110000001110000	-4
	193	00011000111100	-2		193	110000011000001	-4
	194	0001100011001	-2		194	110000011100000	-4
	195	00011000011001	-2		195	11000110000001	-4
	196	00011000011110	-2		196	110001110000000	-4
	197	00011000001111	-2		197	11001100000001	-4
	198	00011111110000	0		198	111000000011111	0
	199	00011111100001	0		199	111000000111110	0
	200	000111111001100	0		200	111000000110011	0
	201	000111111000110	0		201	1110000001111001	0
10	202	000111111000011	0		202	1110000001111100	0
	203	000111100111100	0		203	111000001100011	0
	204	00011110011001	0		204	11100001100110	0
	205	00011110001110	0		205	111000011110001	0
	206	000111100001111	0		206	111000011111000	0
	207	000111001111100	0		207	111000110000111	0
	208	000111001111001	0		208	111000110000110	0
	209	000111001100111	0		209	11100011001100	0
	210	00011100011110	0		210	111000111100001	0
	211	000111000011111	0		211	111000111110000	0
15	212	00011001111100	0		212	111001100000111	0
	213	000110011111001	0		213	11100110000110	0
	214	000110011100111	0		214	11100110001100	0
	215	000110011001111	0		215	11100110011000	0
	216	00011000111110	0		216	111001111000001	0
	217	000110000111111	0		217	111001111100000	0
	218	00001110000011	-4		218	11100000001110	-2
	219	000011000001111	-4		219	11100000011001	-2
	220	00001111110000	-2		220	111000000011100	-2
	221	00001111100001	-2		221	111000000110001	-2
20	222	00001111001100	-2		222	111000000111000	-2
	223	00001111000110	-2		223	11100001100001	-2
	224	000011110000111	-2		224	111000011100000	-2
	225	000011100111100	-2		225	111000110000001	-2
	226	00001110011001	-2		226	111000111100000	-2
	227	00001110001110	-2		227	111001100000001	-2
	228	000011100001111	-2		228	111001110000000	-2
	229	000011001111100	-2		229	11100000001100	-4
	230	000011001100111	-2		230	111000000011000	-4
	231	000011001100111	-2		231	111000000110000	-4
25	232	00001100011110	-2		232	111000011000000	-4
	233	000011000011111	-2		233	111000110000000	-4
	234	00001111111000	0		234	111100000000111	0
	235	000011111110001	0		235	111100000001110	0
	236	00001111100110	0		236	111100000011001	0
	237	00001111100011	0		237	111100000011100	0
	238	00001111001110	0		238	111100000110001	0
	239	000011110001111	0		239	111100000111000	0
	240	000011100111110	0		240	111100011000001	0
	241	000011100011111	0		241	111100011100000	0
30	242	000011001111110	0	4 (D)	242	111100110000001	0
	243	000011000111111	0		243	111100111100000	0
	244	00000111111000	-2		244	111100000000110	-2
	245	000001111110001	-2		245	111100000001100	-2
	246	000001111100110	-2		246	111100000011000	-2
	247	000001111100011	-2		247	111100000110000	-2
	248	000001110001111	-2		248	111100011000000	-2
	249	0000011100011111	-2		249	111100110000000	-2
	250	00000111111100	0		250	111110000000011	0
	251	000001111111001	0		251	111110000000110	0
35	252	000001111100111	0		252	111110000001100	0
	253	0000011111001111	0		253	111110000110000	0
	254	000001110011111	0		254	111110001100000	0
	255	0000011100111111	0		255	111110011000000	0
	5 (C)			5 (D)			
40	256						
	257						
	258						
	259						
	260						
45	261						
	262						
	263						
	264						
	265						
50	266						
	267						
	268						
	269						
	270						
55	271						
	272						
	273						
	274						
	275						

The modulation codes in 5(B) of Table 4 can be changed as shown in Table 12 to improve the end DSV: the six modulation codes whose CDS = 0 in 5(B) is reduced to four by two, and two new modulation codes which have not been used and whose CDS = 2 are added.

5

TABLE 12

10	8-bit data	Modulation codes	CDS
15	248	11111000110001	2
20	249	11111000111000	2
25	250	11111001100001	2
30	251	11111001110000	2

Selecting a modulation code whose CDS = 2 makes it possible to adjust the end DSV at the end of the selected modulation code to 0, when the end DSV at the end of the preceding modulation code is -2, the last bit pattern of the preceding code is any one of the patterns "01", "100", "1000", "10000", "100000", and "1000000", and the signal data is 250 or 251. The modulation codes in 5(C) of Table 5, which are the reversal codes of those in 5(B) of Table 4, can also be changed as shown in Table 13.

30

TABLE 13

35	8-bit data	Modulation codes	CDS
40	248	00000111001110	-2
45	249	00000111000111	-2
50	250	00000110011110	-2
55	251	00000110001111	-2

Modulation codes which are not used in Tables 4 and 12, and whose CDS = 4 can be used in place of the modulation codes in Table 4 or in Tables 4 and 12. Selecting a modulation code whose CDS = 4 when the end DSV at the end of the preceding modulation code is -2 can improve the bit DSV of the selected modulation code because the bit DSV is sure to take 0 at a particular bit in the selected modulation code.

The modulation codes in Table 5 and Table 13, which are reversal patterns of the codes in Table 4 and Table 12, can be changed in a manner similar to the above, resulting in a similar improvement.

The modulation codes specified to correspond to 8-bit data in Tables 4 and 5 are an example, and so the combination of the modulation codes and the 8-bit code can be altered.

Types of the modulation codes that are allowed to take place according to the end pattern of the preceding modulation code are shown in Table 6.

5

TABLE 6

End pattern of the preceding modulation codes		Consecutive number of "0" bits at the beginning of modulation code					Consecutive number of "1" bits at the beginning of modulation code				
		1 (A)	2 (A)	3 (A)	4 (A)	5 (A)	1 (B)	2 (B)	3 (B)	4 (B)	5 (B)
	CDS ≥ 0	1 (A)	2 (A)	3 (A)	4 (A)	5 (A)	1 (B)	2 (B)	3 (B)	4 (B)	5 (B)
	CDS ≤ 0	1 (C)	2 (C)	3 (C)	4 (C)	5 (C)	1 (D)	2 (D)	3 (D)	4 (D)	5 (D)
	.....110	o	o	o	o	o					
	.....1100	o	o	o	o	o		o	o	o	o
	.....11000	o	o	o	o			o	o	o	o
	.....110000	o	o	o				o	o	o	o
	....1100000	o	o					o	o	o	o
	...11000000*	o						o	o	o	o
	.....001							o	o	o	o
	.....0011		o	o	o	o	o	o	o	o	o
	.....00111		o	o	o	o	o	o	o	o	o
	....001111		o	o	o	o	o	o	o		
	...0011111*		o	o	o	o	o				

Notes with regard to Table 6:

55

"o" mark indicates that the modulation codes are allowed.

"*" indicates that a modulation code whose CDS ≥ 0 is selected when the end pattern of the preceding modulation code is "...11000000", and that a modulation code whose CDS ≤ 0 is selected when the end pattern

of the preceding modulation code is "...00111111".

For example, when the end pattern of the preceding modulation code is "...11000", and the end DSV of the preceding modulation code is -2, the modulation codes of classes 1(A), 2(A), 3(A), 4(A), 2(B), 3(B), 4(B), and 5(B) in Table 4 can take place as a current modulation code because the current modulation code to be selected must satisfy the requirements that the CDS ≥ 0 and the number of consecutive identical bits in the joint portion of the two codes is 2 - 7.

In this case, suppose that the current 8-bit data is "166". Then, one of the two possible modulation codes "00111110011001" (CDS = 2; 2(A)), and "1100111100110" (CDS = 4; 2(B)) shown in Table 4 is selected: the end DSV of the preceding modulation code and the CDS of the current modulation code are added so as to obtain the end DSV of the current modulation code; the modulation code which will give less end DSV is selected, that is, the modulation code "00111110011001" (CDS = 2) is selected. The resultant end DSV is 0 and it indicates that the direct current component is removed.

Fig. 3A shows the CNR (carrier-to-noise ratio) characteristics when a sine wave recorded on magnetic tape is reproduced, Fig. 3B shows the power spectrum at the output terminal of the modulator of the embodiment when random 8-bit data are inputted to the modulator, and Fig. 3C shows the power spectrum of the scrambled NRZ at the output terminal of the scrambled NRZ modulator when random 8-bit data are inputted to the scrambled NRZ modulator. From these figures, it is seen that the power spectrum according to the digital modulation method of the present invention includes no direct current component, and is included within a record-reproduction bandwidth in which the high CNR is obtained. As a result, the record-reproduction characteristics of the magnetic tape and head system can be effectively used. Furthermore, the minimum magnetization transition width of the modulation codes of the digital modulation method according to the present invention is 1.14 times the minimum magnetization transition width of the scrambled NRZ. Consequently, the intercode interference can be reduced.

As described above, the embodiment restricts the number of consecutive identical bits in a stream of modulation codes to 2 - 7. As a result, the minimum magnetization transition width is $1.14T = (28)T/14$, where T is the bit period of the 8-bit data), the maximum magnetization transition width is $4.00T = (7 \times 8)T/14$, DR is $1.14 = (2 \times 8)/14$, and the ratio of the maximum magnetization transition width to the minimum magnetization transition width is 3.5. Consequently, the bit error rate of the magnetic recording is reduced, and the high-density recording becomes possible. In addition, azimuth recording and high quality over-writing become possible.

Furthermore, the embodiment restricts the absolute value of CDS of the modulation codes equal to or less than 4, allocates up to 4 modulation codes to each 8-bit data according to the DSV at the end of the preceding modulation code and the end pattern of the preceding code, and selects the modulation code the end DSV of which gives the least absolute value. As a result, the absolute value of the end DSV which is calculated at the end of each modulation code is within 2, and the absolute value of the bit DSV which is calculated at each bit of a modulation code is within 7. Thus, the direct current component can be effectively removed, and hence, the transmission of the modulation codes becomes possible by using a rotary transformer that does not pass the direct current component.

40 [B] SECOND EMBODIMENT

Fig. 6 is a block diagram showing a digital modulation apparatus for carrying out the digital modulation according to the second embodiment of the digital modulation method of the present invention.

In Fig. 6, 8-bit digital data 1 is converted to a 14-bit digital modulation code by an encoder 2. An end pattern judgement portion 3 converts the end pattern of the last 5-bits of the 14-bit digital modulation code into a 4-bit code in Table 21 (although the last 7 bits of the modulation codes are given in Table 21, only the last 5 bits should be considered). A CDS calculation portion 5 computes the CDS of the 14-bit digital modulation code supplied, and converts the resultant CDS into a 3-bit code in Table 20. A DSV calculation portion 4 adds the CDS of the current 14-bit digital modulation code to the DSV at the end of the preceding 14-bit digital modulation code, yielding a new DSV, and converts the new DSV into a 3-bit code shown in Table 20.

A parallel-to-serial converter 8 converts the 14-bit digital modulation code into a serial signal in synchronism with a clock signal 9. A recording portion 10 records the serial modulation signal produced from the parallel-to-serial converter 8 on a recording medium such as magnetic tape or the like.

TABLE 20

	CDS, DSV of modulation codes	Corresponding 3-bit codes
5		
10	-6	000
15	-4	001
20	-2	010
25	0	011
30	2	100
35	4	101
40	6	110
45		
50		
55		

TABLE 21

5	End pattern of the preceding modulation codes	Corresponding 4-bit codes
10	... xxxx110	0000
15	... xxx1100	0001
20	... xx11000	0010
25	... x110000	0011
30	... 1100000	0100
35	... xxxx001	1000
40	... xxx0011	1001
45	... xx00111	1010
50	... x001111	1011
55	... 0011111	1100

x: Don't care bit

The resultant CDS converted into a 3-bit code shown in Table 20 by the CDS calculation portion 5, is supplied to the DSV calculation portion 4.

The DSV calculation portion 4 converts the resultant DSV into a 3-bit code shown in Table 20, and supplies the code to the encoder 2 via a latch 6. The end pattern judgement portion 3 converts the last five bits into a 4-bit code in Table 21, and supplies the code to the encoder 2 via a latch 7.

Next, the method for selecting a 14-bit digital modulation code corresponding to each inputted 8-bit digital data will be described.

First, the method for selecting up to four 14-bit digital modulation codes for each 8-bit digital data will be described.

The 14-bit digital modulation code is selected by the procedures of

(a) selecting among the 2^{14} 14-bit digital codes, a digital code the numbers of consecutive identical bits in which are 6 or less in the first 7 bits, 2 - 7 from the second bit to 13th bit, and 5 or less in the last 6 bits, and repeating this selecting procedure,

(b) selecting among the 14-bit digital codes selected at the procedure (a), a digital code the first bit of which is "0", and the CDS of which has the absolute value equal to or less than 6, and repeating this selecting procedure,

(c) selecting among the 14-bit digital codes selected at the procedure (a), a digital code the first bit of which

is "1", and the CDS of which has the absolute value equal to or less than 4, and repeating this selecting procedure,

(d) selecting among the 14-bit digital codes selected at the procedure (b), a digital code the value of CDS of which is 0, and pairing the selected 14-bit digital code with the reversal code thereof to make the 2 digital codes one group, and repeating this selecting procedure,

(e) selecting among the 14-bit digital codes selected at the procedure (b), a digital code the value of CDS of which is +2, +4 or +6, selecting among the 14-bit digital codes selected at the procedure (c), a digital code the value of CDS of which is +2 or +4, and combining the two selected 14-bit digital codes with the reversal codes thereof to make the 4 digital codes one group, and repeating this selecting procedure, and

(f) selecting 256 groups among the groups formed in the above procedures as the 14-bit digital modulation codes.

Next, the selection procedure of a 14-bit digital modulation code (current modulation code) corresponding to inputted 8-bit data will be described with reference to Fig. 7, which is a flowchart showing the modulation procedure according to the digital modulation method of the present invention.

At step S1, DSV at the end of the preceding modulation code is calculated.

At step S2, the end pattern of the preceding modulation code is judged.

At step S3, when the DSV < 0, the modulation codes in Table 17 are selected, and when DSV > 0, the modulation codes in Table 18 are selected. On the other hand, when DSV = 0 and the end pattern of the preceding code is any one of "...110", "...0011", "...00111", "...001111", and "...0011111", the modulation codes in Table 18 are selected. Further, when DSV = 0 and the end pattern of the preceding code is any one of "...1100", "...11000", "...110000", "...1100000", and "...001", the modulation codes in Table 17 are selected.

At step S4, a modulation code is selected among the selected codes at step S3 and among the classes 1(A) - 6(D) in Tables 17 and 18, according to the end pattern of the preceding modulation code.

At step S5, is selected a modulation code which gives DSV the absolute value of which is minimum when two or more modulation codes are selected at step S4. In this case, the DSV is obtained by adding the DSV at the end of the preceding modulation code and the CDS of the current modulation code.

At step S6, a modulation code that satisfies the following requirements is selected when two or more modulation codes selected at step S5 have the same minimum DSV.

When DSV < 0 at the end of the preceding modulation code, a modulation code whose first bit is "1" is selected.

When DSV > 0 at the end of the preceding modulation code, a modulation code whose first bit is "0" is selected.

When DSV = 0 at the end of the preceding modulation code, a modulation code whose first bit is opposite to the last bit of the preceding modulation code.

The 14-bit digital modulation code thus selected is fed to the parallel-to-serial converter 8. The modulation code entered the parallel-to-serial converter 8 is serially read out in synchronism with the clock 9, and is fed to the recording portion 10, where the 14-bit digital modulation code is recorded on the record medium such as magnetic tape or the like.

On the other hand, the 14-bit digital modulation code selected by the encoder 2 is supplied to the DSV calculation portion 4, and to the modulation code end pattern judgement portion 3. The DSV calculation portion 4 adds the CDS of the current modulation code to the DSV at the end of the preceding modulation code to obtain a new DSV. The new DSV is converted into a 3-bit code according to Table 20, and is supplied to the encoder 2 through latch 6. The end pattern judgement portion 3 converts the last 5 bits of the 14-bit modulation code into a 4-bit code according to Table 21, and supplies the 4-bit code to the encoder 2 through latch 7.

The above procedure is repeated for every 8-bit input data. Thus, a 14-bit digital modulation code train is obtained, in which the number of consecutive identical bits is restricted to 2 - 7, and the absolute value of the DSV is restricted equal to or less than 8.

Next, the 14-bit digital modulation code produced from the encoder 2 in Fig. 6 will be described.

The 14-bit digital modulation code converted from the 8-bit code satisfies the following requirements.

(1) The number of consecutive identical bits in the first 7 bits is equal to or less than 6.

(2) The number of consecutive identical bits included from the second bit to the 13th bit is 2 - 7.

(3) The number of consecutive identical bits included in the last 6 bits is equal to or less than 5.

(4) The absolute value of CDS of the modulation code is equal to or less than 6.

The end patterns of the modulation codes that satisfy the above requirements (1) to (4) are summed up as the following 10 items (A) - (K).

5 (A) 110
(B) 1100
(C) 11000
(D) 110000
(E) 1100000
10 (F) 001
(G) 0011
(H) 00111
(J) 001111
15 (K) 0011111

The beginning of the modulation code succeeding to the modulation codes (A) - (K) is one of the following items.

First, the beginning of the modulation code succeeding to the modulation code (A) is one of the following five items (A1) - (A6).

25 (A1) 011
(A2) 0011...

30 (A3) 00011
(A4) 000011
(A5) 0000011
(A6) 00000011

35 Second, the beginning of the modulation code succeeding to the modulation code (B) is one of the following ten items (B1) - (B10).

40	(B1)	011	...	...	...	...	...
	(B2)	0011	...	...	...	...	...
	(B3)	00011	...	...	...	...	...
	(B4)	000011	...	...	...	...	...
45	(B5)	0000011	...	...	...	...	...
	(B6)	1100	...	...	...	...	...
	(B7)	11100	...	...	...	...	...
	(B8)	111100	...	...	...	...	...
50	(B9)	1111100	...	...	...	...	...
	(B10)	11111100	...	...	...	...	...

55 The beginning of the modulation code succeeding to the modulation code (C) is one of the following nine items (C1) - (C9).

5	(C1)	011	...	...	...	...
	(C2)	0011	...	...	...	...
	(C3)	00011	...	...	...	...
	(C4)	000011	...	...	...	...
	(C5)	1100	...	...	...	...
10	(C6)	11100	...	...	...	...
	(C7)	111100	...	...	...	...
	(C8)	1111100	...	...	...	...
	(C9)	11111100	...	...	...	...

15 The beginning of the modulation code succeeding to the modulation code (D) is one of the following eight items (D1) - (D8)

20	(D1)	011	...	...	...	...
	(D2)	0011	...	...	...	...
	(D3)	00011	...	...	...	...
25	(D4)	1100	...	...	...	...
	(D5)	11100	...	...	...	...
	(D6)	111100	...	...	...	...
	(D7)	1111100	...	...	...	...
30	(D8)	11111100	...	...	...	...

The beginning of the modulation code succeeding to the modulation code (E) is one of the following seven items (E1) - (E7).

35 (E1) 011
(E2) 0011...
(E3) 1100...
40 (E4) 11100
(E5) 111100
(E6) 1111100
45 (E7) 11111100

The beginning of the modulation code succeeding to the modulation code (F) is one of the reversal patterns of the modulation codes (A1) - (A6).

50 The beginning of the modulation code succeeding to the modulation code (G) is one of the reversal patterns of the modulation codes (B1) - (B10).

The beginning of the modulation code succeeding to the modulation code (H) is one of the reversal patterns of the modulation codes (C1) - (C9).

55 The beginning of the modulation code succeeding to the modulation code (J) is one of the reversal patterns of the modulation codes (D1) - (D8).

The beginning of the modulation code succeeding to the modulation code (K) is one of the reversal patterns of the modulation codes (E1) - (E7).

The numbers of the modulation codes that satisfy the requirements (1) - (4) are shown in Tables 14 and

15.

TABLE 14

5

Beginning pattern of modulation codes	The number of possible modulation codes									
	CDS Value								CDS ≤ 0	CDS ≥ 0
	-6	-4	-2	0	2	4	6	Total		
000000011..	5	6	5	1	0	0	0	17	17	1
00000011....	6	9	8	6	0	0	0	29	29	6
000011.....	6	12	14	10	5	0	0	47	42	15
00011.....	7	14	21	20	10	4	0	76	62	34
0011.....	5	17	28	33	25	10	3	121	83	71
011.....	4	15	37	49	46	31	8	190	105	134
Total	33	73	113	119	86	45	11	480	338	261

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TABLE 15

Beginning pattern of modulation codes	The number of possible modulation codes								
	CDS Value							CDS ≤ 0	CDS ≥ 0
	-6	-4	-2	0	2	4	6		
11111100..	0	0	0	1	5	6	5	17	1
11111100....	0	0	0	6	8	9	6	29	6
1111100.....	0	0	5	10	14	12	6	47	15
11100.....	0	4	10	20	21	14	7	76	34
1100.....	3	10	25	33	28	17	5	121	71
100.....	8	31	46	49	37	15	4	190	134
Total	11	45	86	119	113	73	33	480	261
									338

More than 256 modulation codes whose $CDS \geq 0$, and more than 256 modulation codes whose $CDS \leq 0$ are necessary, which follow one of the modulation codes (A) - (K). In addition, the converted modulation code must correspond to one 8-bit data to avoid transmission error.

The number of modulation codes that can succeed one of the modulation codes (A) - (K) is shown in Table 16.

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TABLE 16

End pattern of modulation codes	The number of possible successive modulation codes									CDS ≤ 0	CDS ≥ 0		
	CDS Value								Total				
	-6	-4	-2	0	2	4	6						
.....110	33	73	113	119	86	45	11	480	338	261			
.....1100	31	81	148	188	162	103	40	753	448	493			
.....11000	25	72	140	182	162	103	40	724	419	487			
....110000	19	60	126	172	157	103	40	677	377	472			
...1100000	12	46	105	152	147	99	40	601	315	438			
.....001	11	45	86	119	113	73	33	480	261	338			
.....0011	40	103	162	188	148	81	31	753	493	448			
.....00111	40	103	162	182	140	72	25	724	487	419			
....001111	40	103	157	172	126	60	19	677	472	377			
...0011111	40	99	147	157	105	46	12	601	438	315			

Fig. 8 shows the number of modulation codes of respective classes when $CDS \geq 0$, and Fig. 9 shows the number of modulation code of respective classes when $CDS \leq 0$.

Tables 17 and 18 show the correspondence between the 8-bit data and the modulation codes: Table 17 shows the correspondence when $CDS \geq 0$; and Table 18 shows the correspondence when $CDS \leq 0$.

Table 17 (CDS ≥ 0)

5	Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
10	0	01111110000001	0	0	1	10000001111110	0	0
	1	01111100011000	0		2	100000011100111	0	
	2	01111100011000	0		3	100000011110011	0	
	3	01111100001100	0		4	100000011111001	0	
	4	01111100000110	0		5	100000011111100	0	
	5	01111100000111	0		6	100000011000111	0	
	6	01111001110000	0		7	10000110011110	0	
	7	01111001100001	0		8	10000111000111	0	
	8	01111000111000	0		9	10000111001110	0	
	9	01111000110001	0		10	10000111100011	0	
15	10	01111000011100	0		11	100001111100110	0	
	11	01111000011001	0		12	10000111110001	0	
	12	01111000001110	0		13	10000111111000	0	
	13	01111000000111	0		14	10001100001111	0	
	14	01110011110000	0		15	10001100011110	0	
	15	01110011100001	0		16	10001100110011	0	
	16	01110011001100	0		17	10001100111001	0	
	17	01110011000110	0		18	10001100111100	0	
20	18	01110011000111	0		19	10001110000111	0	
	19	01110001111000	0		20	10001110001110	0	
	20	01110001110001	0		21	10001110011001	0	
	21	01110001100110	0		22	10001110011100	0	
	22	01110001100011	0		23	10001110000011	0	
	23	01110000111100	0		24	1000111000110	0	
	24	01110000111001	0		25	10001110001100	0	
25	25	01110000110011	0	1 (B)	26	1000111100001	0	
	26	01110000011110	0		27	1000111110000	0	
	27	01110000001111	0		28	10011000001111	0	
	28	01100111110000	0		29	10011000011110	0	
	29	01100111100001	0		30	10011000110011	0	
	30	01100111001100	0		31	10011000111001	0	
	31	01100111000110	0		32	10011000111100	0	
	32	01100111000011	0		33	10011001100011	0	
30	33	01100110011100	0		34	10011001100110	0	
	34	01100110011001	0		35	10011001110001	0	
	35	01100110001110	0		36	10011001111000	0	
	36	01100110000111	0		37	10011100000111	0	
	37	01100011111000	0		38	10011100001110	0	
	38	01100011100011	0		39	10011100011001	0	
	39	01100011001110	0		40	10011100011100	0	
35	40	01100011000011	0		41	10011100110001	0	
	41	01100011001110	0		42	10011100111000	0	
	42	01100011000011	0		43	10011110000011	0	
	43	01100001111100	0		44	10011110000110	0	
	44	01100001111001	0		45	10011110001100	0	
	45	01100001110011	0		46	10011110001100	0	
	46	01100001100111	0		47	10011111000001	0	
40	47	01100000111110	0		48	10011111100000	0	
	48	01100000111111	0		49	10000011111110	2	
	49	01111111000001	2		50	10000110011111	2	
	50	01111100011000	2		51	10000111001111	2	
	51	01111100011000	2		52	10000111100111	2	
	52	01111100001100	2		53	10000111110011	2	
	53	01111100000111	2		54	10000111111001	2	
	54	01111100011100	2		55	10000111111100	2	
45	55	01111100011001	2		56	10000111111110	2	
	56	01111100011100	2		57	100001100111110	2	
	57	01111100011001	2		58	100001110001111	2	
	58	01111100001110	2		59	100001110011110	2	
	59	01111100000111	2		60	10001111000111	2	
	60	01111000111100	2		61	100011110011110	2	
	61	01111000110001	2		62	10001111100011	2	
	62	011110001100110	2		63	100011111000110	2	
50	63	011110001100011	2		64	100011111110001	2	
	64	011110000111100	2		65	100011111111000	2	
	65	0111100001111001	2		66	100110000111111	2	

Table 17 (CDS ≥ 0)

5	Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
10	1 (A)	67	01110000011110	2	1 (B)	67	10011000111110	2
		68	0111000001111	2		68	100110001100111	2
		69	01110011111000	2		69	10011001110011	2
		70	0111001110001	2		70	10011001111001	2
		71	01110011100110	2		71	10011001111100	2
		72	01110011100011	2		72	100111000011111	2
		73	01110011001110	2		73	100111000111110	2
		74	01110011000111	2		74	100111000110011	2
		75	01110001111100	2		75	100111001111001	2
		76	01110001111001	2		76	100111001111100	2
		77	01110001110011	2		77	100111100001111	2
		78	01110001100111	2		78	100111100011110	2
		79	01110000111110	2		79	100111100110011	2
		80	01110000011111	2		80	100111100111100	2
		81	01100111111000	2		81	100111110000111	2
		82	0110011110001	2		82	10011111000110	2
		83	01100111100110	2		83	10011111001100	2
		84	01100111100011	2		84	10011111100001	2
		85	011001111001110	2		85	10011111100000	2
		86	011001111000111	2		86	100111111000111	4
20	1 (A)	87	01100110011110	2		87	110000111111110	4
		88	01100110001111	2		88	110001100111111	4
		89	011000111111100	2		89	110001111001111	4
		90	01100011111001	2		90	11000111100111	4
		91	01100011110011	2		91	11000111110011	4
		92	011000111100111	2		92	11000111111001	4
		93	01100011001111	2		93	110001111111100	4
		94	01100001111110	2		94	110011000111111	4
		95	01111110001100	4		95	110011001111110	4
		96	0111111000110	4		96	110011100011111	4
		97	01111111000011	4		97	110011100111110	4
		98	01111110011100	4		98	110011110001111	4
		99	01111110011001	4		99	11001111001110	4
		100	01111100011110	4		100	11001111100011	4
		101	01111110000111	4		101	110000011111110	2
		102	011111001111100	4		102	110000110011111	2
30	2 (B)	103	01111100111001	4		103	110000111001111	2
		104	011111001100111	4		104	110000111100111	2
		105	01111100011110	4		105	11000011111001	2
		106	01111100001111	4		106	110000111111100	2
		107	01111001111100	4		107	110001100011111	2
		108	01111001111001	4		108	110001100111110	2
		109	01111001110011	4		109	110001110001111	2
		110	01111001100111	4		110	110001110011110	2
		111	01111000111110	4		111	110001111000111	2
		112	01111000011111	4		112	110001111001110	2
		113	01110011111100	4		113	11000111110001	2
		114	01110011111001	4		114	110001111111000	2
		115	01110011110011	4		115	110011000011111	2
		116	01110011100111	4		116	110011000111110	2
		117	01110011001111	4		117	110011001100111	2
40	2 (A)	118	01110001111110	4		118	110011001111001	2
		119	01100111111100	4		119	110011001111100	2
		120	0110011111001	4		120	110011100001111	2
		121	01100111110011	4		121	110011100011110	2
		122	01100111100111	4		122	110011100110011	2
		123	01100111001111	4		123	110011100111100	2
		124	01100110011111	4		124	110011110000111	2
		125	01100011111110	4		125	110011110001110	2
		126	01111110001111	6		126	110011110011100	2
		127	01111110001111	6		127	11001111100001	2
		128	01111100011111	6		128	11001111110000	2
50	2 (A)	129	00111111100000	0		129	110000000111111	0
		130	00111111000001	0		130	11000000111110	0
		131	00111110011000	0		131	11000001100111	0
		132	00111110001100	0		132	11000001110011	0
		133	00111110000110	0		133	11000001111001	0

Table 17 (CDS ≥ 0)

	Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5		134	0011110000011	0		134	11000001111100	0
		135	00111100111000	0		135	11000011000111	0
		136	00111100110001	0		136	11000011001110	0
10		137	00111100011100	0		137	11000011100011	0
		138	00111100011001	0		138	11000011100110	0
		139	00111100001110	0		139	11000011110001	0
		140	00111100000111	0		140	11000011111000	0
		141	00111001111000	0		141	11000110000111	0
		142	00111001110001	0		142	11000110001110	0
15		143	00111001100110	0		143	11000110011001	0
		144	00111001100011	0		144	11000110011100	0
		145	00110001111100	0		145	11000111000011	0
		146	00110001100011	0	2 (B)	146	11000111000110	0
		147	00110001100111	0		147	11000111001100	0
		148	0011000011110	0		148	11000111100001	0
		149	0011000011111	0		149	11000111110000	0
		150	0011001111000	0		150	11001100000111	0
		151	00110011110001	0		151	11001100001110	0
20		152	00110011100110	0		152	11001100011001	0
		153	00110011100011	0		153	11001100011100	0
		154	00110011001110	0		154	11001100110001	0
		155	00110011000111	0		155	11001100111000	0
		156	00110001111100	0		156	11001110000011	0
		157	00110001111001	0		157	11001110000110	0
		158	00110001100111	0		158	11001110001100	0
25	2 (A)	159	00110001100111	0		159	11001110011000	0
		160	00110000111110	0		160	11001111000001	0
		161	00110000011111	0		161	11001111100000	0
		162	0011111100001	2		162	11001111100110	4
		163	00111111001100	2		163	11001111110001	4
		164	00111111000110	2		164	11001111111000	4
		165	00111111000011	2		165	11100001111110	4
		166	00111111001100	2		166	11100011100111	4
30		167	00111100011001	2		167	11100011100011	4
		168	00111110001110	2		168	11100011110011	4
		169	00111110000111	2		169	11100011111001	4
		170	00111100111100	2		170	11100011111100	4
		171	00111100111001	2		171	11100110001111	4
		172	00111100110011	2		172	11100110011110	4
		173	00111100011110	2		173	11100111000111	4
35		174	00111100001111	2		174	11100111001110	4
		175	00111001111100	2		175	11100111100011	4
		176	001110011111001	2		176	11100111110010	4
		177	00111001110011	2		177	11100111110001	4
		178	00111001100111	2		178	11100111111000	4
		179	00111000111110	2		179	11100000011111	2
		180	00111000011111	2		180	11100000111110	2
40		181	00110011111100	2	3 (B)	181	11100001100111	2
		182	00110011111001	2		182	11100001110011	2
		183	0011001100111	2		183	11100001111001	2
		184	00110011100111	2		184	11100001111100	2
		185	00110011001111	2		185	11100011000111	2
		186	001100011100110	2		186	11100011001110	2
		187	0011111100110	4		187	11100011100011	2
		188	00111111000111	4		188	11100011100110	2
		189	00111111001110	4		189	11100011110001	2
45		190	00111111000111	4		190	11100011111000	2
		191	001111110011110	4		191	11100110000111	2
		192	001111110001111	4		192	11100110001110	2
		193	001111100111110	4		193	11100110011001	2
		194	001111100011111	4		194	11100110011100	2
		195	001110011111110	4		195	11100111000011	2
		196	001100111111110	4		196	11100111000110	2
50		197	001111111001111	5		197	11100111001100	2
		198	001111110011111	6		198	11100111100001	2
		199	001111110011111	6		199	11100111110000	2

Table 17 (CDS ≥ 0)

	8-bit Class data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	3 (A)	200 000111110000	0	3 (B)	200 11100000001111	0	
		201 0001111100001	0		201 11100000011110	0	
		202 00011111001100	0		202 111000000110011	0	
		203 00011111000110	0		203 111000000111001	0	
		204 00011111000011	0		204 111000000111100	0	
		205 00011111001100	0		205 111000000110011	0	
		206 00011110011001	0		206 111000000110010	0	
		207 00011110001110	0		207 111000000111001	0	
		208 00011110000111	0		208 1110000001111000	0	
		209 00011100111100	0		209 111000011000011	0	
		210 00011100111001	0		210 111000011000110	0	
		211 00011100110011	0		211 111000011001100	0	
		212 00011100011110	0		212 111000011100001	0	
		213 00011100001111	0		213 111000011110000	0	
		214 00011001111100	0		214 11100110000011	0	
10	3 (A)	215 00011001111001	0		215 11100110000110	0	
		216 00011001110011	0		216 11100110001100	0	
		217 00011000110011	0		217 111001100011000	0	
		218 00011000111110	0		218 11100111000001	0	
		219 00011000011111	0		219 11100111100000	0	
		220 0001111110001	2	4 (B)	220 11110000001111	2	
		221 00011111100110	2		221 111100000011110	2	
		222 00011111100011	2		222 111100000110011	2	
		223 00011111001110	2		223 111100000111001	2	
		224 00011111000111	2		224 111100000111100	2	
		225 000111110011110	2		225 111100001100011	2	
		226 000111110001111	2		226 111100001100110	2	
		227 000111100111110	2		227 111100001110001	2	
		228 00011100011111	2		228 111100001111000	2	
		229 00011001111110	2		229 111100011000011	2	
		230 0001111110011	4		230 111100011000110	2	
		231 00011111100111	4		231 111100011001100	2	
		232 00011111001111	4		232 111100011100001	2	
		233 00011110011111	4		233 111100011110000	2	
20	3 (A)	234 0000111111000	0		234 11110000000111	0	
		235 00001111110001	0		235 111100000001110	0	
		236 00001111100110	0		236 111100000011001	0	
		237 00001111100011	0		237 111100000011100	0	
		238 00001111001110	0		238 111100000110001	0	
		239 00001111000111	0		239 111100000111000	0	
		240 00001110011110	0		240 111100001100001	0	
		241 00001110001111	0		241 111100001110000	0	
		242 00001100111110	0		242 111100001100001	0	
		243 00001100111111	0		243 111100001110000	0	
		244 0000111111001	2	5 (B)	244 11111000000111	2	
		245 00001111110011	2		245 111110000011100	2	
		246 00001111100111	2		246 111110000110001	2	
		247 00001111001111	2		247 111110000111000	2	
		248 00001110011111	2		248 111110001110000	2	
45	5 (A)	249 00000111111100	0		249 111110000000011	0	
		250 000001111111001	0		250 111110000000110	0	
		251 000001111100111	0		251 111110000001100	0	
		252 000001111001111	0		252 111110000110000	0	
		253 000001110011111	0		253 111110000110000	0	
50	6 (A)	254 000001100111111	0	5 (B)	254 111110001100000	0	
	6 (A)	255 000000111111110	0	5 (B)	255 111111000000001	0	

Table 18 (CDS ≤ 0)

Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	0	01111110000001	0		0	100000001111110	0
	1	01111100011000	0		1	10000011001111	0
	2	01111100001100	0		2	10000011100111	0
	3	01111100000110	0		3	10000011110011	0
	4	011111000000110	0		4	10000011111001	0
	5	011111000000011	0		5	10000011111100	0
10	6	011110001110000	0		6	10000110001111	0
	7	011110001100001	0		7	100001100111110	0
	8	011110000111000	0		8	100001110001111	0
	9	011110000110001	0		9	100001110011110	0
	10	01111000011100	0		10	100001111000111	0
	11	011110000011001	0		11	100001111100110	0
	12	011110000001110	0		12	100001111110001	0
15	13	011110000000111	0		13	100001111111000	0
	14	01110011110000	0		14	100011000011111	0
	15	01110011100001	0		15	100011000111110	0
	16	01110011001100	0		16	100011001100111	0
	17	01110011000110	0		17	100011001110001	0
	18	01110011000011	0		18	10001100111100	0
20	19	01110001111000	0		19	100011100001111	0
	20	011100011110001	0		20	100011100011110	0
	21	01110001100110	0		21	10001110011001	0
	22	01110001100011	0		22	10001110011100	0
	23	01110000111100	0		23	100011110000111	0
25	24	01110000111001	0		24	100011110001110	0
	25	01110000110011	0		25	10001111001100	0
	26	0111000011110	0		26	10001111100001	0
	27	0111000001111	0	1 (D)	27	10001111110000	0
	28	01100111110000	0		28	10011000001111	0
	29	01100111100001	0		29	100110000111110	0
	30	01100111001100	0		30	100110001100111	0
	31	01100111000110	0		31	100110001110001	0
	32	01100111000011	0		32	10011000111100	0
	33	01100110011100	0		33	100110011000111	0
30	34	01100110011001	0		34	10011001100110	0
	35	01100110001110	0		35	100110011100001	0
	36	01100110000111	0		36	10011001111000	0
	37	01100011111000	0		37	10011100000111	0
	38	01100011110001	0		38	10011100001110	0
	39	01100011001100	0		39	10011100011001	0
	40	01100011000011	0		40	100111000111100	0
35	41	01100011001110	0		41	100111001100001	0
	42	01100011000111	0		42	10011100111000	0
	43	01100011000010	0		43	1001110000011	0
	44	01100001111001	0		44	10011110000110	0
	45	01100001110011	0		45	10011110001100	0
	46	01100001100111	0		46	10011110011000	0
	47	01100000111110	0		47	10011111000001	0
	48	01100000011111	0		48	10011111100000	0
40	49	01111100000001	-2		49	100000001111110	-2
	50	01111001100000	-2		50	10000001100111	-2
	51	01111000110000	-2		51	10000001110011	-2
	52	01111000011000	-2		52	10000001111001	-2
	53	01111000001100	-2		53	10000001111100	-2
	54	01111000000110	-2		54	10000011000111	-2
	55	01111000000011	-2		55	10000011001110	-2
45	56	01110011100000	-2		56	10000011100011	-2
	57	01110011000001	-2		57	10000011100110	-2
	58	01110001110000	-2		58	100000111110001	-2
	59	01110001100001	-2		59	100000111111000	-2
	60	01110000111000	-2		60	10000110000111	-2
	61	01110000110001	-2		61	10000110001110	-2
	62	01110000011100	-2		62	10000110011001	-2
	63	01110000011001	-2		63	100001100111100	-2
	64	01110000001110	-2		64	10000111000011	-2
50	65	01110000000111	-2		65	10000111000110	-2
	66	01100111100000	-2		66	10000111001100	-2

Table 18 (CDS ≤ 0)

	Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	1 (C)	67	011000111000001	-2	1 (D)	67	100001111000001	-2
		68	011000110011000	-2		68	10000111110000	-2
		69	011000110000110	-2		69	100011000000111	-2
		70	011000110000010	-2		70	100011000001110	-2
		71	011000110000011	-2		71	100011000011001	-2
		72	011000111100000	-2		72	10001100011100	-2
		73	011000111000001	-2		73	100011000110001	-2
		74	01100011001100	-2		74	100011001110000	-2
		75	011000110000110	-2		75	100011100000011	-2
		76	011000110000011	-2		76	100011100000110	-2
		77	011000011100000	-2		77	100011100001100	-2
		78	011000011100001	-2		78	100011100011000	-2
		79	01100001100110	-2		79	100011110000001	-2
		80	011000011000011	-2		80	100011111000000	-2
		81	01100000111100	-2		81	10011000000111	-2
10	2 (C)	82	011000001111001	-2		82	10011000001110	-2
		83	01100000110011	-2		83	100110000011001	-2
		84	01100000011100	-2		84	100110000011100	-2
		85	01100000001111	-2		85	100110000110001	-2
		86	01100000001100	-2		86	100110000111000	-2
		87	001111000000001	-4		87	100110011000001	-2
		88	001110011000000	-4		88	100110011100000	-2
		89	001110000110000	-4		89	100111000000011	-2
		90	001110000011000	-4		90	100111000000110	-2
		91	001110000001100	-4		91	100111000001100	-2
		92	001110000000110	-4		92	100111000011000	-2
		93	001110000000111	-4		93	100111000110000	-2
		94	001100111000000	-4		94	100111100000001	-2
		95	001100011000001	-4		95	100000000110011	-4
		96	001100011000000	-4		96	100000000111001	-4
20	30	97	001100011000001	-4		97	100000000111100	-4
		98	001100001110000	-4		98	100000000110001	-4
		99	001100001100001	-4		99	100000000110010	-4
		100	00110000011100	-4		100	100000001110001	-4
		101	001111000000001	-2		101	100000001111100	-4
		102	001111000110000	-2		102	100000011000011	-4
		103	001111000011000	-2		103	100000011000110	-4
		104	001111000001100	-2		104	1000000110001100	-4
		105	001111000000110	-2		105	100000011100001	-4
		106	001111000000111	-2		106	100000011110000	-4
		107	001110011100000	-2		107	100001100000111	-4
		108	001110001100001	-2		108	100001100000110	-4
		109	001110000110000	-2		109	10000110001100	-4
		110	001110000011001	-2		110	100001100110000	-4
35	40	111	001110000011100	-2		111	100001110000001	-4
		112	001110000011001	-2		112	100001111000000	-4
		113	001110000011010	-2		113	100011000000011	-4
		114	001110000000111	-2		114	100011000000110	-4
		115	001100111100000	-2		115	10001100001100	-4
		116	001100111000001	-2		116	100011000011000	-4
		117	001100011001100	-2		117	100011001100000	-4
		118	001100011000110	-2		118	100011100000001	-4
		119	001100011000011	-2		119	100110000000011	-4
		120	001100001111000	-2		120	100110000000110	-4
		121	001100001100001	-2		121	1001100000001100	-4
		122	001100001100010	-2		122	100110000011000	-4
		123	001100001100011	-2		123	100110000110000	-4
		124	00110000111100	-2		124	100110011000000	-4
45	50	125	001100001110001	-2		125	100111000000001	-4
		126	001100000110011	-2		126	100000000111000	-6
		127	001100000011110	-2		127	100000001110000	-6
		128	001100000001111	-2		128	100000011100000	-6
		129	001111111000000	0	2 (D)	129	110000000011111	0
		130	001111110000001	0		130	110000000111110	0
		131	001111100110000	0		131	110000011001111	0
		132	00111110001100	0		132	110000011100111	0

Table 18 (CDS ≤ 0)

Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	133	00111110000110	0		133	11000001111001	0
	134	00111110000111	0		134	11000001111100	0
	135	00111100111000	0		135	110000011000111	0
	136	00111100110001	0		136	110000011001110	0
	137	00111100011100	0		137	110000011000111	0
	138	00111100011001	0		138	110000011100110	0
10	139	00111100001110	0		139	110000011110001	0
	140	00111100000111	0		140	110000011111000	0
	141	00111001111000	0		141	110001100001111	0
	142	00111001110001	0		142	110001100011110	0
	143	00111001100110	0		143	110001100111001	0
	144	00111001100011	0		144	110001100111100	0
	145	00111000111100	0		145	110001110000011	0
15	146	00111000111001	0		146	110001110001110	0
	147	00111000110011	0		147	110001111001100	0
	148	00111000011110	0		148	110001111100001	0
	149	00111000001111	0		149	110001111110000	0
	150	00110011111000	0		150	110011000001111	0
	151	00110011110001	0		151	110011000011110	0
	152	00110011100110	0		152	110011000110011	0
20	153	00110011100011	0		153	110011000111000	0
	154	00110011001110	0		154	110011001100011	0
	155	00110011000111	0		155	110011001110000	0
	156	00110001111100	0		156	110011100000011	0
	157	00110001111001	0	2 (D)	157	110011100001110	0
	158	00110001110011	0		158	110011100011100	0
	159	00110001100111	0		159	110011100110000	0
	160	00110000111110	0		160	110011110000001	0
25	161	00110000011111	0		161	110011111000000	0
	162	00110000011001	-4		162	110000000111110	-2
	163	00110000001110	-4		163	110000000110011	-2
	164	00110000000111	-4		164	110000000111001	-2
	165	00011110000001	-4		165	110000000111100	-2
30	166	000111000110000	-4		166	110000001100011	-2
	167	000111000011000	-4		167	110000001100110	-2
	168	000111000001100	-4		168	110000001110001	-2
	169	000111000000110	-4		169	110000001111000	-2
	170	000111000000011	-4		170	1100000011000011	-2
	171	000110001100000	-4		171	1100000011000110	-2
	172	000110001100001	-4		172	11000000110001100	-2
	173	000110001110000	-4		173	1100000011100001	-2
	174	000110001100001	-4		174	1100000011110000	-2
35	175	000110000111000	-4		175	1100000011000011	-2
	176	000110000011001	-4		176	11000000110000110	-2
	177	000110000011100	-4		177	11000000110001100	-2
	178	000110000001111	-4		178	1100000011100000	-2
	179	000111100000000	-2		179	1100000011100001	-2
	180	000111100000001	-2		180	1100000011110000	-2
	181	000111100011000	-2		181	110011000000111	-2
	182	000111100001100	-2		182	110011000000110	-2
40	183	000111100000110	-2		183	11001110000011100	-2
	184	0001111000000111	-2		184	1100110000110000	-2
	185	000111001110000	-2		185	110011001100000	-2
	186	000111001100001	-2		186	110011100000001	-2
	187	000111000111000	-2		187	110000000011001	-4
	188	000111000011001	-2		188	110000000011100	-4
	189	000111000011100	-2		189	1100000000110001	-4
45	190	000111000000111	-2		190	1100000001110000	-6
	191	00011001111000	-2		191	110000001100001	-6
	192	000110011100001	-2		192	110000001110000	-6
	193	00011001100110	-2		193	110000001100001	-6
	194	00011001100011	-2		194	1100000011100000	-6
	195	00011000111100	-2		195	110001100000001	-6
	196	000110001110001	-2		196	110001100000001	-6
50	197	000110000110011	-2		197	1100000000110000	-6
	198	000110000011110	-2		198	11000000001100000	-6
	199	0001100000011111	-2		199	11000000011000000	-6

Table 18 (CDS ≤ 0)

	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	200	00011111110000	0	3 (C)	200	11100000001111	0
	201	00011111110001	0		201	111000000011110	0
	202	00011111001100	0		202	111000000110011	0
	203	00011111000110	0		203	111000000111001	0
	204	00011111000011	0		204	111000000111100	0
	205	000111100011100	0		205	1110000001100011	0
	206	000111100011001	0		206	1110000001100110	0
	207	00011110001110	0		207	1110000001110001	0
	208	00011110000111	0		208	1110000001111000	0
	209	000111000111100	0		209	1110000001100011	0
	210	000111000111001	0		210	11100000011000110	0
	211	000111000110011	0		211	11100000011001100	0
	212	000111000011110	0		212	1110000001110001	0
	213	000111000001111	0		213	11100000011110000	0
	214	000110011111100	0		214	11100000011000011	0
	215	000110011111001	0		215	111000000110000110	0
	216	000110011100111	0		216	111000000110001100	0
	217	000110000111111	0		217	111000000110011000	0
	218	000110000111110	0		218	11100000011000001	0
	219	000110000111111	0		219	111000000111000000	0
20	220	00001111110000	-2	4 (C)	220	11100000001110	-2
	221	00001111100001	-2		221	111000000011001	-2
	222	00001111001100	-2		222	111000000011100	-2
	223	00001111000110	-2		223	111000000010001	-2
	224	00001111000011	-2		224	1110000000111000	-2
	225	000011100011100	-2		225	1110000000110001	-2
	226	000011100011001	-2		226	11100000001110000	-2
	227	000011100001110	-2		227	1110000000100001	-2
	228	000011100000111	-2		228	11100000001110000	-2
	229	000011000111100	-2		229	11100000001100001	-2
	230	000011000111001	-2		230	11100000001100010	-4
	231	000011000110011	-2		231	11100000001100000	-4
	232	000011000011110	-2		232	111000000011000000	-4
	233	000011000001111	-2		233	111000000011000000	-4
	234	00000111111000	0	4 (D)	234	111100000000111	0
	235	000001111110001	0		235	1111000000001110	0
	236	0000011111000110	0		236	11110000000011001	0
	237	0000011111000011	0		237	11110000000011100	0
	238	0000011110001110	0		238	111100000000110001	0
	239	0000011110000111	0		239	111100000000111000	0
	240	0000011100011110	0		240	111100000000110001	0
	241	0000011100001111	0		241	111100000000111000	0
	242	0000011000111110	0		242	1111000000001100001	0
	243	0000011000011111	0		243	1111000000001110000	0
30	244	000000111110000	-2	5 (C)	244	1111000000000110	-2
	245	0000001111000011	-2		245	11110000000001100	-2
	246	000000110001110	-2		246	111100000000011000	-2
	247	0000001110000111	-2		247	1111000000000110000	-2
	248	0000001100001111	-2		248	1111000000000110000	-2
	249	000000111111000	0		249	11111000000000011	0
	250	0000001111000011	0		250	11111000000000110	0
	251	0000001111100011	0		251	111110000000001100	0
	252	0000001111000111	0		252	1111100000000011000	0
	253	0000001110001111	0		253	11111000000000110000	0
45	254	0000001100011111	0	6 (C)	254	11111000000000001	0
	255	000000011111110	0		255	11111100000000001	0

Types of the modulation codes that are allowed to take place according to the end pattern of the preceding modulation code are shown in Table 19.

TABLE 19

End pattern of the preceding modulation codes	Consecutive number of "0" bits at the beginning of modulation code						Consecutive number of "1" bits at the beginning of modulation code					
	1 (A)	2 (A)	3 (A)	4 (A)	5 (A)	6 (A)	1 (B)	2 (B)	3 (B)	4 (B)	5 (B)	6 (B)
$CDS \geq 0$												
$CDS \leq 0$	1 (C)	2 (C)	3 (C)	4 (C)	5 (C)	6 (C)	1 (D)	2 (D)	3 (D)	4 (D)	5 (D)	6 (D)
.....110	o	o	o	o	o	o						
.....1100	o	o	o	o	o			o	o	o	o	o
.....11000	o	o	o	o				o	o	o	o	o
....110000	o	o	o					o	o	o	o	o
....1100000	o	o						o	o	o	o	o
.....001								o	o	o	o	o
.....0011	o	o	o	o	o	o	o	o	o	o	o	o
.....00111	o	o	o	o	o	o	o	o	o	o	o	o
.....001111	o	o	o	o	o	o	o	o	o	o		
....0011111	o	o	o	o	o	o	o	o				

"o" mark indicates that the modulation codes are allowed.

For example, when the end pattern of the preceding modulation code is "...11000", and the end DSV of the preceding modulation code is -4, the modulation codes of classes 1(A), 2(A), 3(A), 4(A), 2(B), 3(B), 4(B), 5(B) and (6B) in Table 17 can take place as a current modulation code.

In this case, suppose that the current 8-bit data is "166". Then, one of the two possible modulation codes "0011110011100" (CDS = 2; 2(A)), and "11100011001111" (CDS = 4; 2(B)) is selected: the end DSV at the end of the preceding modulation code and the CDS of the current modulation code are added so as to obtain the end DSV at the end of the current modulation code; the modulation code which will give less DSV is selected, that is, the modulation code "11100011001111" (CDS = 4) is selected. The resultant DSV is 0 and it indicates that the direct current component is removed.

Fig. 3A shows the CNR (carrier-to-noise ratio) characteristics when a sine wave recorded on magnetic tape is reproduced, Fig. 3B shows the power spectrum at the output terminal of the modulator of the embodiment when random 8-bit data are inputted to the modulator, and Fig. 3C shows the power spectrum of the scrambled NRZ at the output terminal of the scrambled NRZ modulator when random 8-bit data are inputted to the scrambled NRZ modulator.

As described above, the embodiment restricts the number of consecutive identical bits in a stream of modulation codes to 2 - 7. As a result, the minimum magnetization transition width is $1.14T$ ($= (2 \times 8)T/14$, where T is the bit period of the 8-bit data), the maximum magnetization transition width is $4.00T$ ($= (7 \times 8)T/14$), DR is 1.14 ($= (2 \times 8)/14$), and the ratio of the maximum magnetization transition width to the minimum magnetization transition width is 3.5. Consequently, the bit error rate of the magnetic recording is reduced, and the high-density recording becomes possible. In addition, azimuth recording and high quality over-writing become possible.

Furthermore, the embodiment restricts the absolute value of CDS of the modulation codes equal to or less than 6, allocates up to 4 modulation codes to each 8-bit data according to the DSV at the end of the preceding modulation code and the end pattern of the preceding code, and selects the modulation code the DSV of which gives the least absolute value. As a result, the maximum value of the absolute value of the end DSV can be restricted within 4. Thus, the direct current component can be effectively removed, and hence, the transmission of the modulation codes becomes possible by using a rotary transformer that does not pass the direct current component.

Although specific embodiments of a digital modulation method in accordance with the present invention have been disclosed, it is not intended that the invention be restricted to either the specific configurations or the uses disclosed herein. Modifications may be made in a manner obvious to those skilled in the art. Accordingly, it is intended that the invention be limited only by the scope of the appended claims.

25 Claims

1. A digital modulation method for converting 8-bit digital data into 14-bit digital modulation codes, said digital modulation method characterized by comprising:

30 step 1 for selecting up to four 14-bit digital modulation codes for each 8-bit digital data, said 14-bit digital modulation code is selected by the procedures of

(a) selecting among the 2^{14} 14-bit digital codes, a digital code the numbers of consecutive identical bits in which are 5 or less in the first 6 bits, 2 - 7 from the second bit to 13th bit, and 6 or less in the last 7 bits, the absolute value of CDS (code word digital sum) of the selected digital code being 4 or less, and repeating this selecting procedure,

(b) selecting among the selected 14-bit digital codes at the procedure (a), a digital code the first bit of which is "0", and the value of CDS of which is 0, and pairing the selected 14-bit digital code with the reversal code thereof to make the 2 digital codes one group, or selecting among the selected 14-bit digital codes at the procedure (a), a digital code the first bit of which is "1", and the value of CDS of which is +2 or +4, combining the selected 14-bit digital codes with the reversal codes thereof, and further combining the two 14-bit digital codes with a pair of 14-bit digital codes selected at the above procedure to make the 4 digital codes one group, and repeating this selecting procedure,

(c) selecting among the selected 14-bit digital codes at the procedure (a), a digital code the first bit of which is "0", and the value of CDS of which is +2, and another digital code the first bit of which is "1", and the value of CDS of which is +2 or +4, and combining the two selected 14-bit digital codes with the reversal codes thereof to make the 4 digital codes one group, and repeating this selecting procedure,

(d) selecting among the selected 14-bit digital codes at the procedure (a), a digital code the first bit of which is "0", and the value of CDS of which is +4, and another digital code the first bit of which is "1", and the value of CDS of which is +2, and combining the two selected 14-bit digital codes with the reversal codes thereof to make the 4 digital codes one group, and repeating this selecting procedure, and

(e) selecting 256 groups among the groups formed in the above procedures as the 14-bit digital modulation codes;

55 step 2 for selecting one group of 14-bit digital modulation codes among the 256 groups of the 14-bit digital modulation codes, the selected group corresponding to inputted 8-bit digital data;

step 3 for further selecting one or more 14-bit digital modulation codes in the selected group at step 2, each of the 14-bit digital modulation codes satisfying the requirement that the number of consecutive

Identical bits at the joint portion of the preceding 14-bit digital modulation code already selected and the 14-bit digital modulation code to be selected is 2 - 7; and

step 4 for further selecting one 14-bit digital modulation code among the selected modulation codes at step 3 so that said one 14-bit digital modulation code satisfies the requirement that the absolute value of bit DSV (Digital Sum Value) for each bit in the modulation code is equal to or less than 7;

5. 2. A digital modulation method as claimed in claim 1, characterized in that said step 3 comprises the procedures of:

10 selecting any one of the digital modulation codes the first bits of which are "01", "001", "0001", "00001", and "000001" when the preceding digital modulation code that has already been selected terminates with "10";

15 selecting any one of the digital modulation codes the first bits of which are "10", "110", "1110", "11110", and "111110" when the preceding digital modulation code that has already been selected terminates with "01";

20 selecting any one of the digital modulation codes the first bits of which are "110", "1110", "11110", "111110", "01", "001", "0001", "00001", and "000001" when the preceding digital modulation code that has already been selected terminates with "100";

25 selecting any one of the digital modulation codes the first bits of which are "001", "0001", "00001", "000001", "10", "110", "1110", "11110", and "111110" when the preceding digital modulation code that has already been selected terminates with "011";

30 selecting any one of the digital modulation codes the first bits of which are "110", "1110", "11110", "111110", "01", "001", "0001", and "00001" when the preceding digital modulation code that has already been selected terminates with "1000";

35 selecting any one of the digital modulation codes the first bits of which are "001", "0001", "00001", "000001", "10", "110", "1110", and "11110" when the preceding digital modulation code that has already been selected terminates with "0111";

40 selecting any one of the digital modulation codes the first bits of which are "110", "1110", "11110", "111110", "01", and "001" when the preceding digital modulation code that has already been selected terminates with "100000";

45 selecting any one of the digital modulation codes the first bits of which are "001", "0001", "00001", "000001", "10", and "110" when the preceding digital modulation code that has already been selected terminates with "011111";

50 selecting any one of the digital modulation codes the first bits of which are "110", "1110", "11110", "111110", and "01" when the preceding digital modulation code that has already been selected terminates with "1000000"; and

55 selecting any one of the digital modulation codes the first bits of which are "001", "0001", "00001", "000001", and "10" when the preceding digital modulation code that has already been selected terminates with "0111111";

3. A digital modulation method as claimed in claim 1, characterized in that said step 4 comprises the procedures of:

50 selecting any one of the digital modulation codes the CDS of which are 0, -2 and -4, when the DSV at the end of the preceding 14-bit digital modulation code that has already been selected is +2;

55 selecting any one of the digital modulation codes the CDS of which are +2, 0 and -2, when the DSV at the end of the preceding 14-bit digital modulation code that has already been selected is 0; and

60 selecting any one of the digital modulation codes the CDS of which are +4, +2, and 0 when the DSV at the end of the preceding 14-bit digital modulation code that has already been selected is -2;

55. 4. A digital modulation method as claimed in claim 1, characterized in that said digital modulation codes obtained at step 1 are the codes described in the following Tables 4 and 5, or the codes obtained by substituting a part of Table 4 by the following Table 12, or the codes obtained by substituting a part of Table 5 by the following Table 13.

Table 4 (CDS ≥ 0)

Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	0	01111110000001	0		0	10000001111110	0
	1	01111100110000	0		1	10000011001111	0
	2	01111100011000	0		2	10000011100111	0
	3	01111100001100	0		3	10000011110011	0
	4	01111100000110	0		4	10000011111001	0
	5	01111100000011	0		5	10000011111100	0
10	6	01111001110000	0		6	10000110001111	0
	7	01111001100001	0		7	10000110011110	0
	8	01111000111000	0		8	10000111000111	0
	9	01111000110001	0		9	10000111001110	0
	10	01111000011100	0		10	10000111100011	0
	11	01111000011001	0		11	10000111100110	0
15	12	01111000001110	0		12	10000111110001	0
	13	01111000001111	0		13	10000111111000	0
	14	01110011110000	0		14	10001100001111	0
	15	01110011110001	0		15	10001100011110	0
	16	01110011001100	0		16	10001100110011	0
	17	01110011000110	0		17	10001100111001	0
	18	01110011000011	0		18	10001100111100	0
20	19	01110001111000	0		19	10001110000111	0
	20	01110001110001	0		20	10001110001110	0
	21	01110001100110	0		21	10001110011001	0
	22	01110001100011	0		22	10001110011100	0
	23	01110000111100	0		23	10001111000011	0
	24	01110000111001	0		24	10001111000110	0
25	25	01110000110011	0		25	10001111100110	0
	26	01110000011110	0		26	10001111110001	0
	27	01110000001111	0		27	10001111111000	0
	28	01100111110000	0		28	10011000001111	0
	29	01100111110001	0		29	10011000011110	0
	30	01100111001100	0		30	10011000110011	0
30	31	01100111000110	0		31	10011000111001	0
	32	01100111000011	0		32	10011000111100	0
	33	01100110011100	0	1(B)	33	10011001100011	0
	34	01100110011001	0	1(B)	34	10011001100110	0
	35	01100110001110	0		35	10011001110001	0
	36	01100110000111	0		36	10011001111000	0
35	37	01100011111000	0		37	10011100000111	0
	38	01100011110001	0		38	10011100001110	0
	39	01100011100110	0		39	10011100011001	0
	40	01100011100011	0		40	10011100011100	0
	41	01100011001110	0		41	10011100110001	0
	42	01100011000111	0		42	10011100111000	0
	43	01100001111100	0		43	10011110000011	0
40	44	01100001110001	0		44	10011110000110	0
	45	01100001100011	0		45	10011110001100	0
	46	01100001100111	0		46	10011110011000	0
	47	01100000111110	0		47	10011111000001	0
	48	01100000011111	0		48	10011111100000	0
	49	01111111001100	4		49	10000111111110	2
45	50	01111111000110	4		50	10000110011111	2
	51	01111111000011	4		51	10000111001111	2
	52	011111110011100	4		52	10000111100111	2
	53	011111110011001	4		53	10000111110011	2
	54	011111110001110	4		54	10000111111001	2
	55	011111110000111	4		55	100001111111100	2
	56	011111100111100	4		56	10001100011111	2
50	57	011111100111001	4		57	10001100111110	2
	58	011111100110011	4		58	10001110001111	2
	59	011111100011110	4		59	10001110011110	2
	60	011111000011111	4		60	10001111000111	2
	61	011111001111100	4		61	10001111001110	2
	62	011111001111001	4		62	10001111100011	2
55	63	011111001110011	4		63	10001111100110	2

Table 4 (CDS ≥ 0)

Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	64	01111001100111	4		64	10001111110001	2
	65	01111000111110	4		65	10001111111000	2
	66	01111000011111	4		66	10011000011111	2
	67	01110011111100	4		67	10011000111110	2
	68	01110011111001	4		68	10011001100111	2
	69	01110011110011	4		69	10011001110011	2
10	70	01110011100111	4		70	10011001111001	2
	71	01110011001111	4		71	10011001111100	2
	72	01110001111110	4		72	10011100001111	2
	73	01110000111111	4		73	10011100011110	2
	74	01100111111100	4		74	10011100110011	2
	75	01100111111001	4		75	10011100111001	2
15	76	01100111110011	4		76	10011100111100	2
	77	01100111100111	4		77	10011110000111	2
	78	01100111001111	4		78	10011110001110	2
	79	01100110011111	4	1(B)	79	10011110011101	2
	80	01100011111110	4		80	10011110011100	2
	81	01111111000001	2		81	10011111000011	2
20	82	01111110011000	2		82	10011111000110	2
	83	01111110001100	2		83	10011111001100	2
	84	01111110000110	2		84	10011111000001	2
	85	01111110000011	2		85	10011111110000	2
	86	01111100111100	2		86	10001111100111	4
	87	01111100110001	2		87	10001111100111	4
	88	01111100011100	2		88	10001111110011	4
25	89	01111100011001	2		89	10011001111110	4
	90	01111100001110	2		90	10011100111110	4
	91	01111100000111	2		91	10011110001111	4
	92	01111001111100	2		92	10011110011110	4
	93	01111001110001	2		93	10011111000111	4
	94	01111001100110	2		94	10011111001110	4
30	95	01111001100011	2		95	10011111100011	4
	96	01111000111100	2		96	10011111100110	4
	97	01111000111001	2		97	110001111100111	4
35	98	01111000110011	2		98	110001111110011	4
	99	01111000011110	2		99	11000000111111	2
	100	01111000001111	2		100	11000011111110	2
	101	01110011111100	2		101	11000011001111	2
	102	01110011110001	2		102	11000011100111	2
	103	01110011001100	2		103	11000011110011	2
	104	01110011100011	2		104	11000011111001	2
	105	01110011001110	2		105	11000011111110	2
	106	01110011000111	2		106	110000110001111	2
40	107	01110001111100	2		107	11000011001110	2
	108	01110001111001	2	2(B)	108	110001111000111	2
	109	01110001110011	2		109	110001111001110	2
	110	01110001100111	2		110	11000111100011	2
	111	01110000111110	2		111	110001111100110	2
	112	01110000011111	2		112	110001111110001	2
45	113	01100111111100	2		113	110001111111000	2
	114	01100111110001	2		114	11001100001111	2
	115	01100111100110	2		115	11001100011110	2
	116	01100111100011	2		116	11001100110011	2
	117	01100111001110	2		117	11001100111001	2
	118	01100111000111	2		118	11001100111100	2
	119	01100110011110	2		119	11001110000111	2
50	120	01100110001111	2		120	11001110001110	2
	121	01100011111100	2		121	11001110011001	2
	122	01100011111001	2		122	11001110011100	2
	123	01100011110011	2		123	11001111000011	2
	124	01100011100111	2		124	11001111000110	2
	125	01100011001111	2		125	11001111001100	2
55	126	01100001111110	2		126	11001111100001	2
	127	01100000111111	2		127	11001111110000	2

Table 4 (CDS ≥ 0)

	Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5		128	00111111000000	0		128	11000000011111	0
		129	00111111000001	0		129	11000000111110	0
		130	00111111001100	0		130	11000001100111	0
10		131	00111110001100	0		131	11000001110011	0
		132	00111110000110	0		132	11000001111001	0
		133	00111110000011	0		133	11000001111100	0
		134	00111100111000	0		134	11000011000111	0
		135	00111100110001	0		135	11000011001110	0
		136	00111100011100	0		136	11000011100011	0
		137	00111100011001	0		137	11000011100110	0
		138	00111100001110	0		138	11000011110001	0
15		139	00111100000111	0		139	11000011111000	0
		140	00111001111000	0		140	11000110000111	0
		141	00111001110001	0		141	11000110001110	0
		142	00111001100110	0		142	11000110011001	0
		143	00111001100011	0	2(B)	143	11000110011100	0
		144	00111000111100	0		144	11000111000011	0
		145	00111000111001	0		145	11000111000110	0
20		146	00111000110011	0		146	11000111001100	0
		147	00111000011110	0		147	11000111100001	0
		148	00111000001111	0		148	11000111110000	0
		149	00110011111000	0		149	11001100000111	0
		150	00110011110001	0		150	11001100001110	0
		151	00110011100110	0		151	11001100011001	0
25		152	00110011100011	0		152	11001100011100	0
		153	00110011001110	0		153	11001100110001	0
		154	00110011000111	0		154	11001100111000	0
		155	00110001111100	0		155	11001110000011	0
		156	00110001111001	0		156	11001110000110	0
		157	00110001100011	0		157	11001110001100	0
30		158	00110001100111	0		158	11001110011000	0
		159	00110000111110	0		159	11001111000001	0
		160	00110000111111	0		160	11001111100000	0
	2(A)	161	00111111100001	2		161	11001100111110	4
		162	00111111001100	2		162	11001110011110	4
		163	00111111000110	2		163	11001111000111	4
		164	00111111000011	2		164	11001111001110	4
35		165	00111110011100	2		165	11001111100011	4
		166	00111110011001	2		166	11001111100110	4
		167	00111100011110	2		167	11100001111110	4
		168	00111110000111	2		168	11100011100111	4
		169	001111100111100	2		169	11100011110011	4
40		170	0011111001111001	2		170	111000111111100	4
		171	001111100110011	2		171	11100110011110	4
		172	001111100011110	2	3(B)	172	11100111000111	4
		173	001111100001111	2		173	11100111001110	4
		174	001110011111100	2		174	11100111100011	4
		175	00111001111001	2		175	11100111100110	4
		176	00111001100011	2		176	11100111111000	4
45		177	00111001100111	2		177	11100000011111	2
		178	00111000111110	2		178	11100000111110	2
		179	00111000011111	2		179	11100001100111	2
		180	001100111111100	2		180	11100001110011	2
		181	00110011111001	2		181	111000011111001	2
		182	00110011110011	2		182	11100001111100	2
		183	0011001100111	2		183	11100011000111	2
50		184	00110011001111	2		184	11100011001110	2
		185	00110001111110	2		185	11100011100011	2
		186	001100001111111	2		186	11100011100110	2
		187	00111111100110	4		187	11100011110001	2
		188	00111111100011	4		188	11100011111000	2
		189	001111111001110	4		189	11100110000111	2
55		190	001111111000111	4		190	11100110001110	2
		191	001111110011110	4		191	11100110011001	2

Table 4 (CDS ≥ 0)

	Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	2(A)	192	00111110001111	4	3(B)	192	11100110011100	2
		193	00111100111110	4		193	111001111000011	2
		194	00111100011111	4		194	111001111000110	2
		195	00111001111110	4		195	11100111001100	2
		196	00111000111111	4		196	111001111100001	2
		197	00110011111110	4		197	111001111100000	2
10	3(A)	198	0001111110000	0		198	11100000011111	0
		199	00011111100001	0		199	111000000111110	0
		200	000111110001100	0		200	111000000110011	0
		201	00011111000110	0		201	111000000111001	0
		202	000111110000011	0		202	111000000111100	0
		203	000111110011100	0		203	111000001100011	0
		204	00011110011001	0		204	111000001100110	0
		205	00011110001110	0		205	111000001110001	0
		206	00011110000111	0		206	111000001111000	0
		207	000111100111100	0		207	1110000011000011	0
		208	000111001111001	0		208	111000110001110	0
		209	00011100110011	0		209	11100011001100	0
		210	00011100011110	0		210	111000111100001	0
		211	00011100001111	0		211	111000111110000	0
20	3(A)	212	00011001111100	0		212	11100110000011	0
		213	00011001111001	0		213	11100110000110	0
		214	00011001110011	0		214	11100110001100	0
		215	00011001100111	0		215	11100110011000	0
		216	00011000111110	0		216	11100111000001	0
		217	00011000011111	0		217	111001111100000	0
		218	0001111110001	2	4(B)	218	11110001111100	4
		219	0001111110010	2		219	111100111111000	4
		220	00011111100011	2		220	11110000001111	2
		221	00011111001110	2		221	11110000011110	2
		222	00011111000011	2		222	11110000110011	2
		223	00011110011110	2		223	11110000111001	2
		224	00011110001111	2		224	11110000111100	2
		225	000111100111110	2		225	11110001100011	2
		226	000111000111111	2		226	11110001100110	2
		227	00011001111110	2		227	111100011110001	2
		228	00011000111111	2		228	111100011111000	2
		229	00011111100111	4		229	11110011000011	2
		230	00011111001111	4		230	11110011000110	2
		231	000111110011111	4		231	11110011001100	2
		232	000111100111111	4		232	111100111100001	2
		233	000111001111111	4		233	111100111110000	2
40	4(A)	234	00001111111000	0	5(B)	234	11110000000111	0
		235	00001111110001	0		235	111100000001110	0
		236	00001111100110	0		236	111100000011001	0
		237	00001111100011	0		237	111100000011100	0
		238	00001111001110	0		238	111100000110001	0
		239	00001111000111	0		239	111100001110000	0
		240	00001110011110	0		240	111100011000001	0
		241	000011100011111	0		241	111100011100000	0
		242	00001100111110	0		242	111100110000001	0
		243	000011000111111	0		243	111100111100000	0
50	5(A)	244	00001111111001	2		244	111110000000111	2
		245	00001111110011	2		245	111110000001110	2
		246	00001111100111	2		246	111110000110001	2
		247	000011110011111	2		247	111110000111000	2
		248	000011100111111	2		248	111110000111100	2
55	5(A)	249	000011001111111	2		249	111110011100000	2
		250	000001111111100	0		250	111110000000011	0
		251	000001111111001	0		251	111110000000110	0
		252	000001111110011	0		252	111110000001100	0
		253	000001111100111	0		253	111110000110000	0
		254	000001110011111	0		254	111110001100000	0
		255	000001100111111	0		255	111110011000000	0

Table 5 (CDS ≤ 0)

Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	0	01111110000001	0		0	10000001111110	0
	1	01111100110000	0		1	10000011001111	0
	2	01111100011000	0		2	10000011100111	0
	3	01111100001100	0		3	10000011110011	0
	4	01111100000110	0		4	10000011111001	0
10	5	01111100000011	0		5	10000011111100	0
	6	01111001110000	0		6	10000110001111	0
	7	01111001100001	0		7	10000110011111	0
	8	01111000111000	0		8	10000111000111	0
	9	01111000110001	0		9	10000111001110	0
15	10	01111000011100	0		10	10000111100011	0
	11	01111000011001	0		11	10000111100110	0
	12	01111000001110	0		12	10000111110001	0
	13	01111000000111	0		13	10000111111000	0
	14	01110011110000	0		14	10001100001111	0
	15	01110011110001	0		15	10001100011110	0
	16	01110011001100	0		16	10001100110011	0
20	17	01110011000110	0		17	10001100111001	0
	18	01110011000011	0		18	10001100111100	0
	19	01110001111000	0		19	10001110000111	0
	20	01110001110001	0		20	10001110001110	0
	21	01110001100110	0		21	10001110011001	0
	22	01110001100011	0		22	10001110011100	0
	23	01110000111100	0		23	10001111000011	0
25	24	01110000111001	0		24	10001111000110	0
	25	01110000110011	0		25	10001111001100	0
	26	01110000011110	0		26	10001111100001	0
	27	01110000001111	0		27	10001111110000	0
	28	01100111110000	0		28	10011000001111	0
	29	01100111110001	0		29	10011000011110	0
30	30	01100111001100	0		30	10011000110011	0
	31	01100111000110	0		31	10011000111001	0
	32	01100111000011	0		32	10011000111100	0
	33	01100110011100	0	1(D)	33	10011001100011	0
35	34	01100110011001	0	1(D)	34	10011001100110	0
	35	01100110001110	0		35	10011001110001	0
	36	01100110000111	0		36	10011001111000	0
	37	01100011111000	0		37	10011100001111	0
	38	01100011110001	0		38	10011100001110	0
	39	01100011100110	0		39	10011100011001	0
40	40	01100011100011	0		40	10011100011100	0
	41	01100011001110	0		41	10011100110001	0
	42	01100011000111	0		42	10011100111000	0
	43	01100001111100	0		43	10011110000011	0
	44	01100001111001	0		44	10011110000110	0
	45	01100001110011	0		45	10011110001100	0
	46	01100001100111	0		46	10011110011000	0
	47	01100000111110	0		47	10011111000001	0
	48	01100000111111	0		48	10011111100000	0
45	49	01111100000001	-2		49	10000000110011	-4
	50	01111001100000	-2		50	10000000111001	-4
	51	01111000110000	-2		51	10000000111100	-4
	52	01111000011000	-2		52	10000001100011	-4
	53	01111000001100	-2		53	10000000110010	-4
	54	01111000000110	-2		54	100000001110001	-4
	55	01111000000011	-2		55	100000001111000	-4
50	56	01110011110000	-2		56	10000011000011	-4
	57	01110011000001	-2		57	10000011000110	-4
	58	01110001110000	-2		58	10000011001100	-4
	59	01110001100001	-2		59	10000011100001	-4
	60	01110000111000	-2		60	10000011110000	-4
	61	01110000110001	-2		61	10000110000011	-4
55	62	01110000011100	-2		62	10000110000110	-4
	63	01110000011001	-2		63	10000110001100	-4

Table 5 (CDS ≤ 0)

Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	64	01110000001110	-2		64	10000110011000	-6
	65	01110000000111	-2		65	10000111000001	-4
	66	01100111100000	-2		66	10000111100000	-6
	67	01100111100001	-2		67	10001100000011	-4
10	68	01100110011000	-2		68	10001100000110	-4
	69	01100110001100	-2		69	10001100001100	-4
	70	01100110000110	-2		70	10001100011000	-4
	71	01100110000011	-2		71	10001100110000	-4
	72	01100011110000	-2		72	10001110000001	-4
	73	01100011110001	-2		73	10001111000000	-6
	74	01100011001100	-2		74	10011000000011	-4
15	75	01100011000110	-2		75	10011000000110	-6
	76	01100011000011	-2		76	10011000001100	-4
	77	01100001111000	-2		77	10011000011000	-6
	78	011000011110001	-2		78	10011000110000	-4
	79	01100001100110	-2		79	10011001100000	-6
	80	01100001100011	-2		80	10011100000001	-4
20	81	01100000111100	-2		81	10000000111110	-2
	82	011000001111001	-2		82	10000001100111	-2
	83	01100000110011	-2		83	10000001110011	-2
	84	01100000011110	-2		84	10000001111100	-2
	85	01100000001111	-2		85	10000001111100	-2
	86	01110000110000	-4		86	10000011000111	-2
	87	01110000110000	-4		87	10000011001110	-2
	88	01110000001100	-4		88	10000011100011	-2
25	89	01100110000001	-4		89	10000011100110	-2
	90	01100011000001	-4		90	10000011110001	-2
	91	01100001110000	-4		91	10000011111000	-2
	92	01100001100001	-4		92	10000110000111	-2
	93	01100000111000	-4		93	10000110001110	-2
	94	01100000110001	-4		94	10000110011001	-2
30	95	01100000011100	-4		95	10000110011100	-2
	96	01100000011001	-4		96	10000111000011	-2
	97	00111000011000	-4		97	10000111000110	-2
	98	00111000001100	-4	1(D)	98	10000111001100	-2
	99	00111111000000	-2		99	10000111100001	-2
35	100	00111110000001	-2		100	10000111110000	-2
	101	00111100110000	-2		101	10001100000111	-2
	102	00111100011000	-2		102	10001100001110	-2
	103	00111100001100	-2		103	10001100011001	-2
	104	00111100000110	-2		104	10001100011100	-2
	105	00111100000011	-2		105	10001100110001	-2
	106	00111001110000	-2		106	10001100111000	-2
40	107	00111001100001	-2		107	10001110000011	-2
	108	00111000111000	-2		108	10001110000110	-2
	109	00111000110001	-2	2(C)	109	10001110001100	-2
	110	00111000011100	-2		110	10001110011000	-2
	111	00111000011001	-2		111	10001111000001	-2
	112	00111000001110	-2		112	10001111100000	-2
45	113	00111000001111	-2		113	10011000000111	-2
	114	00110011110000	-2		114	10011000001110	-2
	115	00110011100001	-2		115	10011000011001	-2
	116	00110011001100	-2		116	10011000011100	-2
	117	00110011000110	-2		117	10011000110001	-2
	118	00110011000011	-2		118	10011000111000	-2
	119	00110001111000	-2		119	10011001100001	-2
50	120	00110001110001	-2		120	10011001110000	-2
	121	00110001100110	-2		121	10011100000011	-2
	122	00110001100011	-2		122	10011100000110	-2
	123	00110000111100	-2		123	10011100001100	-2
	124	00110000111001	-2		124	10011100011000	-2
	125	00110000110011	-2		125	10011100110000	-2
55	126	00110000011110	-2		126	10011110000001	-2
	127	00110000011111	-2		127	10011111000000	-2

Table 5 (CDS ≤ 0)

	Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	2(C)	128	00111111000000	0	128	11000000011111	0	0
		129	00111111000001	0	129	11000000111110	0	0
		130	00111110011000	0	130	11000001100111	0	0
		131	00111110001100	0	131	11000001110011	0	0
		132	00111110000110	0	132	11000001111001	0	0
		133	00111110000011	0	133	11000001111100	0	0
		134	00111100111000	0	134	11000011000111	0	0
		135	00111100011001	0	135	11000011001110	0	0
		136	00111100011100	0	136	11000011100011	0	0
		137	00111100011001	0	137	11000011100110	0	0
		138	00111100001110	0	138	11000011110001	0	0
		139	00111100000111	0	139	11000011111000	0	0
		140	00111001111000	0	140	11000110000111	0	0
		141	00111001110001	0	141	11000110001110	0	0
		142	00111001100110	0	142	11000110011001	0	0
		143	00111001100011	0	143	11000110011100	0	0
		144	00111000111100	0	144	11000111000011	0	0
		145	00111000111001	0	145	11000111000110	0	0
		146	00111000110011	0	146	11000111001100	0	0
		147	00111000011110	0	147	11000111100001	0	0
		148	00111000001111	0	148	11000111110000	0	0
		149	00110011111000	0	149	11001100000111	0	0
		150	00110011110001	0	150	11001100001110	0	0
		151	00110011100110	0	151	11001100011001	0	0
		152	00110011100011	0	152	11001100011100	0	0
		153	00110011001110	0	153	11001100110001	0	0
		154	00110011000111	0	154	11001100111000	0	0
		155	00110001111100	0	155	11001110000011	0	0
		156	00110001111001	0	156	11001110000110	0	0
		157	00110001100111	0	157	11001110001100	0	0
		158	00110001100111	0	158	11001110011000	0	0
		159	00110000111110	0	159	11001111000001	0	0
		160	00110000011111	0	160	11001111100000	0	0
		161	00110011000001	-4	161	11000000011110	-2	
		162	00110001100001	-4	162	11000000011001	-2	
		163	00110000111000	-4	163	110000000111001	-2	
		164	00110000110001	-4	164	110000000111100	-2	
		165	00110000011100	-4	165	110000001100011	-2	
		166	00110000011001	-4	166	110000001100110	-2	
	3(C)	167	00011110000001	-4	167	11000001110001	-2	
		168	00011100011000	-4	168	11000001111000	-2	
		169	00011100001100	-4	169	11000011000011	-2	
		170	000111000000011	-4	170	110000110000110	-2	
		171	00011001100001	-4	171	11000011001100	-2	
		172	00011000111000	-4	172	11000011100001	-2	
		173	00011000110001	-4	173	11000011110000	-2	
		174	00011000011100	-4	174	11000110000011	-2	
		175	00011000011001	-4	175	11000110000110	-2	
		176	00011000000111	-4	176	11000110001100	-2	
		177	00011111000000	-2	177	11000110011000	-2	
		178	00011111000001	-2	178	11000111000001	-2	
		179	000111100011000	-2	179	11000111100000	-2	
		180	00011110001100	-2	180	11001100000011	-2	
		181	000111100000110	-2	181	11001100000110	-2	
		182	000111100000011	-2	182	11001100001100	-2	
		183	00011100111000	-2	183	11001100011000	-2	
		184	00011100110001	-2	184	11001100110000	-2	
		185	00011100011100	-2	185	11001110000001	-2	
		186	00011100011001	-2	186	11001111000000	-2	
		187	00011100001110	-2	187	11000000011001	-4	
		188		00011100000111	-2	188	11000000011100	-4
		189		00011001111000	-2	189	11000000110001	-4
		190		00011001110001	-2	190	11000000111000	-4
		191		00011001100110	-2	191	11000001100001	-4

Table 5 (CDS ≤ 0)

Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	192	00011001100011	-2		192	11000001110000	-4
	193	00011000111100	-2		193	11000011000001	-4
	194	00011000111001	-2		194	11000011100000	-4
	195	00011000110011	-2		195	11000110000001	-4
	196	00011000011110	-2		196	11000111000000	-4
	197	00011000001111	-2	2(D)	197	11001100000001	-4
10	198	00011111100000	0		198	11100000001111	0
	199	00011111100001	0		199	11100000011110	0
	200	00011111001100	0		200	11100000110011	0
15	201	00011111000110	0		201	11100000111001	0
	202	00011111000011	0		202	11100000111100	0
	203	00011110011100	0		203	11100001100011	0
	204	00011110011001	0		204	11100001100110	0
	205	00011110001110	0		205	11100001110001	0
	206	00011110000111	0		206	11100001111000	0
	207	00011100111100	0		207	11100011000011	0
	208	00011100111001	0		208	11100011000110	0
	209	00011100110011	0		209	11100011001100	0
20	210	00011100011110	0		210	11100011100001	0
	211	00011100001111	0		211	11100011110000	0
	212	00011001111100	0		212	11100110000011	0
	213	00011001111001	0		213	11100110000110	0
	214	00011001110011	0	3(D)	214	11100110001100	0
	215	00011001100111	0		215	11100110011000	0
	216	00011000111110	0		216	11100111000001	0
25	217	00011000011111	0		217	11100111100000	0
30	218	00001110000011	-4		218	11100000001110	-2
	219	00001100000111	-4		219	11100000011001	-2
	220	00001111110000	-2		220	11100000011100	-2
	221	00001111100001	-2		221	11100000110001	-2
	222	000011111001100	-2		222	11100000111000	-2
	223	000011111000110	-2		223	111000001100001	-2
	224	000011110000111	-2		224	111000001110000	-2
35	225	00001110011100	-2		225	11100011000001	-2
	226	00001110011001	-2		226	11100011100000	-2
	227	00001110001110	-2		227	11100110000001	-2
	228	00001110000111	-2		228	11100111000000	-2
	229	000011001111100	-2		229	11100000001100	-4
	230	000011001111001	-2		230	111000000011000	-4
	231	000011001100111	-2		231	111000000110000	-4
	232	00001100011110	-2		232	111000001100000	-4
	233	00001100001111	-2		233	11100011000000	-4
40	234	00001111111000	0		234	11110000000111	0
	235	00001111110001	0		235	11110000001110	0
	236	00001111100110	0		236	11110000011001	0
	237	00001111100011	0		237	11110000011100	0
	238	000011111001110	0		238	11110000110001	0
	239	000011111000111	0		239	11110000111000	0
	240	00001110011110	0		240	11110001100001	0
	241	000011100011111	0	4(D)	241	11110001110000	0
45	242	00001100111110	0		242	11110011000001	0
	243	000011000111111	0		243	11110011100000	0
50	244	00000111111100	-2		244	11110000000110	-2
	245	000001111110001	-2		245	11110000001100	-2
	246	000001111100110	-2		246	111100000011000	-2
	247	000001111100011	-2		247	111100000110000	-2
	248	000001111000111	-2		248	11110001100000	-2
	249	000001100011111	-2		249	11110011000000	-2
55	250	000001111111100	0		250	11111000000011	0
	251	000001111111001	0		251	11111000000110	0
	252	000001111100111	0	5(D)	252	1111100001100	0
	253	000001111001111	0		253	11111000011000	0
	254	000001110011111	0		254	11111000110000	0
	255	000001100111111	0		255	11111001100000	0

TABLE 12

8-bit data	Modulation codes	CDS
248	11111000110001	2
249	11111000111000	2
250	11111001100001	2
251	11111001110000	2

TABLE 13

8-bit data	Modulation codes	CDS
248	00000111001110	-2
249	00000111000111	-2
250	00000110011110	-2
251	00000110001111	-2

5. A digital modulation method for converting 8-bit digital data into 14-bit digital modulation codes, said digital modulation method comprising:

40 step 1 for selecting up to four 14-bit digital modulation codes for each 8-bit digital data, said 14-bit digital modulation code is selected by the procedures of

45 (a) selecting among the 2^{14} 14-bit digital codes, a digital code the numbers of consecutive identical bits in which are 6 or less in the first 7 bits, 2 - 7 from the second bit to 13th bit, and 5 or less in the last 6 bits, and repeating this selecting procedure,

50 (b) selecting among the 14-bit digital codes selected at the procedure (a), a digital code the first bit of which is "0", and the CDS of which has the absolute value equal to or less than 6, and repeating this selecting procedure,

55 (c) selecting among the 14-bit digital codes selected at the procedure (a), a digital code the first bit of which is "1", and the CDS of which has the absolute value equal to or less than 4, and repeating this selecting procedure,

(d) selecting among the 14-bit digital codes selected at the procedure (b), a digital code the value of CDS of which is 0, and pairing the selected 14-bit digital code with the reversal code thereof to make the 2 digital codes one group, and repeating this selecting procedure,

(e) selecting among the 14-bit digital codes selected at the procedure (b), a digital code the value of CDS of which is +2, +4 or +6, selecting among the 14-bit digital codes selected at the procedure

(c), a digital code the value of CDS of which is +2 or +4, and combining the two selected 14-bit digital codes with the reversal codes thereof to make the 4 digital codes one group, and repeating this selecting procedure, and

5 (f) selecting 256 groups among the groups formed in the above procedures as the 14-bit digital modulation codes;

step 2 for selecting one group of 14-bit digital modulation codes among the 256 groups of the 14-bit digital modulation codes, said selected group corresponding to inputted 8-bit digital data;

10 step 3 for further selecting one or more 14-bit digital modulation codes in the selected group at step 2, each of the 14-bit digital modulation codes satisfying the requirement that the number of consecutive identical bits at the joint portion of the preceding 14-bit digital modulation code already selected and the 14-bit digital modulation code to be selected is 2 - 7; and

15 step 4 for further selecting one 14-bit digital modulation code among the selected modulation codes at step 3 so that said one 14-bit digital modulation code satisfies the requirement that the absolute value of bit DSV for each bit in the modulation code is equal to or less than 8.

6. A digital modulation method as claimed in claim 5, wherein said step 3 comprises the procedures of:

selecting any one of the digital modulation codes the first bits of which are "01", "001", "0001", "00001", "000001", and "0000001" when the preceding digital modulation code that has already been selected terminates with "10";

20 selecting any one of the digital modulation codes the first bits of which are "10", "110", "1110", "11110", "111110", and "1111110" when the preceding digital modulation code that has already been selected terminates with "01";

25 selecting any one of the digital modulation codes the first bits of which are "110", "1110", "11110", "111110", "01", "001", "0001", "00001", and "000001" when the preceding digital modulation code that has already been selected terminates with "100";

30 selecting any one of the digital modulation codes the first bits of which are "001", "0001", "00001", "000001", "0000001", "10", "110", "1110", "11110", and "111110" when the preceding digital modulation code that has already been selected terminates with "011";

35 selecting any one of the digital modulation codes the first bits of which are "110", "1110", "11110", "111110", "1111110", "01", "001", "0001", and "00001" when the preceding digital modulation code that has already been selected terminates with "1000";

40 selecting any one of the digital modulation codes the first bits of which are "001", "0001", "00001", "000001", "0000001", "10", "110", "1110", and "11110" when the preceding digital modulation code that has already been selected terminates with "0111";

45 selecting any one of the digital modulation codes the first bits of which are "110", "1110", "11110", "111110", "1111110", "01", "001", and "0001" when the preceding digital modulation code that has already been selected terminates with "10000";

selecting any one of the digital modulation codes the first bits of which are "001", "0001", "00001", "000001", "0000001", "10", "110", and "1110" when the preceding digital modulation code that has already been selected terminates with "01111";

selecting any one of the digital modulation codes the first bits of which are "110", "1110", "11110", "111110", "1111110", "01", and "001" when the preceding digital modulation code that has already been selected terminates with "100000"; and

selecting any one of the digital modulation codes the first bits of which are "001", "0001", "00001", "000001", "0000001", "10", and "110" when the preceding digital modulation code that has already been selected terminates with "011111".

7. A digital modulation method as claimed in claim 5, wherein said step 4 comprises the procedures of:

selecting any one of the digital modulation codes the CDS of which are 0, -2, -4, and -6 when the DSV at the end of the preceding 14-bit digital modulation code that has already been selected is +4 or +2;

50 selecting any one of the digital modulation codes the CDS of which are +4, +2, 0, -2, and -4 when the DSV at the end of the preceding 14-bit digital modulation code that has already been selected is 0; and

55 selecting any one of the digital modulation codes the CDS of which are +6, +4, +2, and 0 when the DSV at the end of the preceding 14-bit digital modulation code that has already been selected is -2 or -4;

8. A digital modulation method as claimed in claim 5, wherein said digital modulation codes are the codes described in the following Tables 17 and 18.

5

Table 17 (CDS ≥ 0)

Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
10	0	0111110000001	0		0	10000001111110	0
	1	01111100110000	0		1	10000011001111	0
	2	01111100011000	0		2	10000011100111	0
	3	01111100001100	0		3	10000011110011	0
	4	01111100000110	0		4	10000011111001	0
	5	01111100000011	0		5	10000011111100	0
	6	01111100111000	0		6	10000110001111	0
15	7	01111100110001	0		7	10000110011110	0
	8	01111100011100	0		8	10000111000111	0
	9	011111000011001	0		9	10000111001110	0
	10	011111000011100	0		10	100001111100011	0
	11	011111000011001	0		11	100001111100110	0
	12	011111000001110	0		12	100001111110001	0
	13	011111000000111	0		13	100001111110000	0
20	14	01110011110000	0		14	10001100001111	0
	15	011100111100001	0		15	10001100011110	0
	16	01110011001100	0		16	10001100110011	0
	17	01110011000110	0		17	10001100111001	0
	18	01110011000011	0		18	10001100111100	0
	19	01110001111000	0		19	10001110000111	0
	20	01110001110001	0		20	10001110001110	0
25	21	01110001100110	0		21	10001110011001	0
	22	01110001100011	0		22	10001110011100	0
	23	01110000111100	0		23	10001111000011	0
	24	01110000111001	0		24	10001111000110	0
	25	01110000110011	0	1 (B)	25	10001111001100	0
	26	0111000011110	0		26	10001111100001	0
	27	0111000001111	0		27	10001111110000	0
	28	0110011110000	0		28	10011000001111	0
30	29	01100111100001	0		29	10011000011110	0
	30	01100111001100	0		30	10011000110011	0
	31	011001110000110	0		31	10011000111001	0
	32	01100111000011	0		32	10011000111100	0
	33	01100110011100	0		33	10011001100011	0
	34	01100110011001	0		34	10011001100110	0
35	35	01100110001110	0		35	10011001110001	0
	36	011000110000111	0		36	100110001111000	0
	37	01100011111000	0		37	10011100000111	0
	38	01100011110001	0		38	10011100001110	0
	39	01100011100110	0		39	10011100011001	0
	40	01100011100011	0		40	10011100011100	0
	41	01100011001110	0		41	10011100110001	0
40	42	01100011000111	0		42	10011100111000	0
	43	01100001111100	0		43	10011110000011	0
	44	01100001111001	0		44	10011110000110	0
	45	01100001110011	0		45	10011110001100	0
	46	01100001100111	0		46	10011110011000	0
	47	01100000111110	0		47	10011111000001	0
	48	01100000011111	0		48	100111111000000	0
	49	0111111000001	2		49	10000011111110	2
45	50	01111110001100	2		50	10000110011111	2
	51	011111100011100	2		51	10000111001111	2
	52	011111100001110	2		52	10000111100111	2
	53	011111100000111	2		53	10000111110011	2
	54	011111001111000	2		54	10000111111001	2
	55	01111100110001	2		55	10000111111100	2
	56	01111100011100	2		56	10000110001111	2
	57	011111000011001	2		57	10000110011110	2
50	58	01111100001110	2		58	100001110001111	2
	59	011111000001111	2		59	100001110011110	2
	60	011111001111000	2		60	100001111000111	2
	61	011111001110001	2		61	100001111001110	2
	62	011111001100110	2		62	100001111100011	2
	63	011111001100011	2		63	100001111100110	2
	64	011111000111100	2		64	100001111110001	2
55	65	011111000111001	2		65	100001111111000	2
	66	011111000110011	2		66	100110000111111	2

Table 17 (CDS ≥ 0)

	Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5		67	01111000011110	2		67	10011000111110	2
		68	01111000001111	2		68	10011001100111	2
		69	01110011111000	2		69	10011001111001	2
10		70	011100111110001	2		70	100110011110011	2
		71	01110011100110	2		71	10011001111100	2
		72	01110011100011	2		72	10011100001111	2
		73	01110011001110	2		73	10011100011110	2
		74	01110011000111	2		74	10011100110011	2
		75	01110001111100	2		75	100111001111001	2
		76	01110001111001	2		76	100111001111100	2
		77	01110001110011	2		77	10011110000111	2
15		78	01110001100111	2		78	10011110001110	2
		79	01110000111110	2		79	10011110011001	2
		80	01110000011111	2		80	10011110011100	2
		81	01100111111000	2		81	100111110000011	2
		82	011001111110001	2		82	10011111000110	2
		83	011001111100110	2		83	10011111001100	2
		84	011001111000111	2		84	100111111100001	2
		85	01100111001110	2		85	100111111100000	2
20	1 (A)	86	011001110001111	2		86	100111110001111	4
		87	01100110011110	2		87	11000011111110	4
		88	01100110001111	2		88	11000110011111	4
		89	0110001111100	2		89	11000111001111	4
		90	01100011111001	2		90	11000111100111	4
		91	011000111110011	2		91	11000111110011	4
		92	01100011100111	2		92	11000111111001	4
		93	01100011001111	2		93	11000111111100	4
		94	011000011001110	2		94	11001100011111	4
		95	0111111001100	4		95	11001100111110	4
		96	01111111000110	4		96	11001110001111	4
		97	01111111000011	4		97	11001110011110	4
		98	01111110011100	4		98	11001111000111	4
		99	01111110011001	4		99	11001111001110	4
30		100	01111110001110	4		100	11001111100011	4
		101	01111110000111	4		101	11000001111110	2
		102	01111100111100	4		102	11000011001111	2
		103	011111001111001	4		103	11000011100111	2
		104	011111001100111	4		104	11000011110011	2
		105	01111100011110	4		105	11000011111001	2
		106	01111100001111	4		106	11000011111100	2
		107	01111001111100	4		107	11000110001111	2
		108	011110011111001	4		108	11000110011110	2
		109	01111001110011	4		109	11000111000111	2
		110	01111001100111	4		110	11000111001110	2
		111	0111100011110	4		111	11000111100011	2
		112	01111000011111	4		112	11000111100110	2
		113	01110011111100	4		113	11000111110001	2
		114	01110011111001	4		114	11000111111000	2
		115	01110011100111	4		115	11001100001111	2
		116	01110011001111	4		116	11001100011110	2
		117	01110011001111	4		117	11001100110011	2
		118	01110001111110	4		118	110011001111001	2
		119	0110011111100	4		119	11001100111100	2
		120	01100111111001	4		120	11001110000111	2
		121	01100111110011	4		121	11001110001110	2
		122	01100111100111	4		122	110011100111001	2
		123	01100111001111	4		123	110011100111100	2
		124	01100110011111	4		124	11001111000011	2
		125	01100011111110	4		125	11001111000110	2
		126	01111111000111	6		126	11001111001100	2
		127	011111110001111	6		127	11001111100001	2
		128	01111100011111	6		128	11001111110000	2
50	2 (A)	129	00111111100000	0		129	11000000011111	0
		130	00111111000001	0		130	110000000111110	0
		131	001111110011000	0		131	110000001100111	0
		132	001111110001100	0		132	110000001110011	0
		133	001111100001100	0		133	110000001111001	0

Table 17 (CDS ≥ 0)

5	Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS	
10		134	00111110000011	0		134	11000001111100	0	
		135	00111100111000	0		135	11000011000111	0	
		136	00111100110001	0		136	11000011001110	0	
		137	00111100011100	0		137	11000011100011	0	
		138	00111100011001	0		138	11000011100110	0	
		139	00111100001110	0		139	11000011110001	0	
		140	00111100000111	0		140	11000011111000	0	
		141	00111001110000	0		141	11000110000111	0	
		142	00111001110001	0		142	11000110001110	0	
		143	00111001100110	0		143	11000110011001	0	
		144	00111001100011	0		144	11000110011100	0	
		145	00111000111100	0		145	11000111000011	0	
		146	00111000111001	0	2 (B)	146	11000111000110	0	
		147	00111000110011	0		147	11000111001100	0	
		148	00111000011110	0		148	11000111100001	0	
		149	00111000001111	0		149	11000111110000	0	
		150	00110011111000	0		150	11001100000111	0	
		151	00110011110001	0		151	11001100001110	0	
		152	00110011100110	0		152	11001100011001	0	
		153	00110011100011	0		153	11001100011100	0	
		154	00110011001110	0		154	11001100110001	0	
		155	00110011000111	0		155	11001100111000	0	
		156	00110001111100	0		156	11001110000011	0	
		157	00110001111001	0		157	11001110001100	0	
		158	00110001100111	0		158	11001110001100	0	
		159	00110001100111	0		159	11001110011000	0	
	25	2 (A)	160	00110000111110	0		160	11001111000001	0
		161	00110000011111	0		161	11001111100000	0	
		162	00111111100001	2		162	11001111100110	4	
		163	00111111100110	2		163	11001111110001	4	
		164	00111111100010	2		164	11001111111000	4	
		165	00111111000011	2		165	11100001111110	4	
		166	00111110011100	2		166	11100011001111	4	
		167	00111110011001	2		167	11100011100111	4	
		168	00111110001110	2		168	11100011110011	4	
		169	00111110000111	2		169	11100011111001	4	
		170	00111100111100	2		170	11100011111100	4	
		171	00111100111001	2		171	11100110001111	4	
		172	00111100110011	2		172	11100110011110	4	
		173	00111100011110	2		173	11100110001111	4	
		174	00111100001111	2		174	11100110011110	4	
		175	00111100111110	2		175	11100111000011	4	
		176	00111001111100	2		176	11100111100110	4	
		177	00111001110011	2		177	11100111110001	4	
		178	00111001100111	2		178	11100111111000	4	
		179	00111000111110	2		179	11100000011111	2	
		180	00111000011111	2		180	11100000111110	2	
		181	00110011111100	2	3 (B)	181	11100001100111	2	
		182	00110011111001	2		182	11100011100111	2	
		183	00110011100111	2		183	11100011110011	2	
		184	00110011100111	2		184	11100011111000	2	
		185	00110011001111	2		185	11100011000111	2	
		186	00110001111110	2		186	11100011001110	2	
		187	00111111001110	4		187	11100011100001	2	
		188	00111111000111	4		188	11100011100110	2	
		189	00111111001110	4		189	11100011110001	2	
		190	00111111000111	4		190	11100011111000	2	
		191	00111110011110	4		191	11100110000111	2	
		192	00111110001111	4		192	11100110001110	2	
		193	00111110011110	4		193	11100110011001	2	
		194	00111110001111	4		194	11100110011100	2	
		195	00111001111110	4		195	11100111000011	2	
		196	00110011111110	4		196	11100111000110	2	
		197	00111111001111	6		197	11100111001100	2	
		198	00111111001111	6		198	11100111100001	2	
		199	00111110011111	6		199	11100111110000	2	

Table 17 (CDS ≥ 0)

	8-bit Class data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	3 (A)	200 0001111110000	0	3 (B)	200 11100000001111	0	
		201 00011111100001	0		201 11100000011110	0	
		202 000111111001100	0		202 11100000110011	0	
		203 000111111000110	0		203 11100000111001	0	
		204 000111111000011	0		204 11100000111100	0	
		205 000111110011100	0		205 11100001100011	0	
		206 00011110011001	0		206 11100001100110	0	
		207 00011110001110	0		207 11100001110001	0	
		208 00011110000111	0		208 11100001111000	0	
		209 00011100111100	0		209 11100011000011	0	
		210 000111001111001	0		210 11100011000110	0	
		211 00011100110011	0		211 11100011001100	0	
		212 00011100011110	0		212 11100011100001	0	
		213 00011100001111	0		213 11100011110000	0	
		214 00011001111100	0		214 11100110000011	0	
		215 000110011111001	0		215 11100110000110	0	
		216 00011001110011	0		216 11100110001100	0	
		217 00011001100111	0		217 11100110011000	0	
		218 00011000111110	0		218 11100111000001	0	
		219 00011000011111	0		219 11100111100000	0	
20	4 (A)	220 0001111110001	2	4 (B)	220 11110000001111	2	
		221 00011111100010	2		221 11110000011110	2	
		222 00011111100011	2		222 11110000110011	2	
		223 00011111100110	2		223 11110000111001	2	
		224 00011111100011	2		224 11110000111100	2	
		225 00011110011110	2		225 11110000110001	2	
		226 00011110001111	2		226 11110000110010	2	
		227 00011100011110	2		227 11110000110001	2	
		228 00011100001111	2		228 11110000111000	2	
		229 00011001111110	2		229 11110001100001	2	
		230 00011111110011	4		230 11110001100010	2	
		231 00011111000111	4		231 111100011000100	2	
		232 00011110001111	4		232 11110001100001	2	
		233 00011110001111	4		233 111100011110000	2	
30	5 (A)	234 0000111111000	0	5 (B)	234 11110000000111	0	
		235 00001111110001	0		235 11110000001110	0	
		236 00001111100010	0		236 11110000011001	0	
		237 00001111100011	0		237 11110000011100	0	
		238 00001110001100	0		238 111100000110001	0	
		239 00001110000111	0		239 111100000111000	0	
		240 00001110011110	0		240 111100001100001	0	
		241 00001110001111	0		241 111100001100000	0	
		242 00001100011110	0		242 111100001100001	0	
		243 00001100001111	0		243 111100001110000	0	
40	5 (A)	244 0000111111001	2	6 (B)	244 11111000000111	2	
		245 00001111110011	2		245 11111000011100	2	
		246 00001111000111	2		246 111110000110001	2	
		247 00001111001111	2		247 111110000111000	2	
		248 00001110011111	2		248 111110001100000	2	
		249 00000111111100	0		249 111110000000011	0	
		250 000001111111001	0		250 111110000000110	0	
		251 00000111110011	0		251 111110000001100	0	
		252 00000111100111	0		252 111110000011000	0	
		253 00000111001111	0		253 111110000110000	0	
		254 00000110011111	0		254 111110001100000	0	
45	6 (A)	255 00000011111110	0	6 (B)	255 111111000000001	0	

Table 18 (CDS ≤ 0)

5	Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
10	0	01111110000001	0	0	1	10000001111110	0	0
	1	01111100110000	0		1	10000011001111	0	
	2	01111100011000	0		2	10000011100111	0	
	3	01111100001100	0		3	10000011110011	0	
	4	01111100000110	0		4	10000011111001	0	
	5	01111100000011	0		5	10000011111100	0	
	6	011111001110000	0		6	10000110001111	0	
	7	011111001100001	0		7	1000011001111110	0	
	8	011110001110000	0		8	100001110001111	0	
	9	011110001100001	0		9	100001110011110	0	
	10	01111000011100	0		10	100001111000011	0	
	11	011110000100110	0		11	10000111100110	0	
	12	01111000001110	0		12	10000111110001	0	
15	13	01111000000111	0		13	10000111111000	0	
	14	01110011110000	0		14	10001100001111	0	
	15	01110011100001	0		15	10001100011110	0	
	16	01110011001100	0		16	10001100110011	0	
	17	01110011000110	0		17	10001100111001	0	
	18	01110011000011	0		18	10001100111100	0	
	19	01110001111000	0		19	10001110000111	0	
20	20	01110001110001	0		20	10001110001110	0	
	21	01110001100110	0		21	10001110011001	0	
	22	01110001100011	0		22	10001110011100	0	
	23	01110000111100	0		23	10001111000011	0	
	24	01110000111001	0		24	10001111000110	0	
	25	01110000110011	0		25	10001111001100	0	
25	1 (C)	01110000011110	0	1 (D)	26	10001111100001	0	
	27	01110000001111	0		27	10001111110000	0	
	28	01100111110000	0		28	10011000001111	0	
	29	01100111100001	0		29	10011000011110	0	
	30	01100111001100	0		30	10011000110011	0	
	31	01100111000110	0		31	10011000111001	0	
	32	01100111000011	0		32	10011000111100	0	
	33	01100110011100	0		33	10011001100011	0	
30	34	01100110011001	0		34	10011001100110	0	
	35	01100110001110	0		35	10011001110001	0	
	36	01100110000111	0		36	10011001111000	0	
	37	01100011111000	0		37	10011100000111	0	
	38	01100011110001	0		38	10011100001110	0	
	39	01100011001110	0		39	100111000011001	0	
	40	01100011000011	0		40	100111000011100	0	
	41	01100011001110	0		41	10011100110001	0	
35	42	01100011000111	0		42	10011100111000	0	
	43	01100011111000	0		43	10011100000111	0	
	44	01100001111001	0		44	10011110000110	0	
	45	01100001110011	0		45	10011110001100	0	
	46	01100001100111	0		46	10011110011000	0	
	47	01100000111110	0		47	10011111000001	0	
	48	01100000111111	0		48	100111111100000	0	
40	49	0111100000001	-2		49	10000000111110	-2	
	50	01111001100000	-2		50	10000001100111	-2	
	51	01111000110000	-2		51	10000001110011	-2	
	52	01111000011000	-2		52	10000001111001	-2	
	53	01111000001100	-2		53	10000001111100	-2	
	54	01111000000110	-2		54	100000011000111	-2	
	55	01111000000011	-2		55	100000011001110	-2	
45	56	01110011100000	-2		56	10000011100011	-2	
	57	01110011000001	-2		57	10000011100110	-2	
	58	01110000111000	-2		58	100000111110001	-2	
	59	01110000110001	-2		59	100000111111000	-2	
	60	01110000111000	-2		60	10000110000111	-2	
	61	01110000110001	-2		61	10000110001110	-2	
	62	01110000011100	-2		62	10000110011001	-2	
50	63	01110000011001	-2		63	100001100111100	-2	
	64	01110000001110	-2		64	100001110000011	-2	
	65	01110000000111	-2		65	10000111000110	-2	
	66	011001111100000	-2		66	10000111001100	-2	

Table 18 (CDS ≤ 0)

	Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
5	1 (C)	67	01100111000001	-2	1 (D)	67	10000111100001	-2
		68	01100110011000	-2		68	10000111110000	-2
		69	01100110001100	-2		69	10001100000111	-2
		70	01100110000110	-2		70	10001100001110	-2
		71	01100110000011	-2		71	10001100011001	-2
		72	01100011110000	-2		72	10001100011100	-2
		73	01100011100001	-2		73	10001100110001	-2
		74	01100011001100	-2		74	10001100111000	-2
		75	01100011000110	-2		75	10001110000011	-2
		76	01100011000011	-2		76	10001110001110	-2
		77	01100001111000	-2		77	10001110001100	-2
		78	01100001110001	-2		78	10001110011000	-2
		79	01100001100110	-2		79	10001111000001	-2
		80	01100001000111	-2		80	10001111100000	-2
		81	01100000111100	-2		81	10011000000011	-2
		82	01100000111101	-2		82	10011000001110	-2
10	1 (C)	83	01100000110011	-2		83	10011000011001	-2
		84	01100000011110	-2		84	10011000011100	-2
		85	01100000001111	-2		85	100110000110001	-2
		86	011000000011100	-6		86	100110000111000	-2
		87	00111100000001	-4		87	10011001100001	-2
		88	00111001100000	-4		88	10011001110000	-2
		89	00111000110000	-4		89	10011100000011	-2
		90	00111000011000	-4		90	10011100000110	-2
		91	00111000001100	-4		91	10011100001100	-2
		92	00111000000110	-4		92	10011100011000	-2
		93	00111000000111	-4		93	10011100110000	-2
		94	00110011100000	-4		94	10011110000001	-2
		95	00110011000001	-4		95	10000000110011	-4
		96	00110001110000	-6		96	10000000111001	-4
		97	00110001100001	-4		97	10000000111100	-4
		98	00110000111000	-4		98	10000001100011	-4
		99	00110000110001	-6		99	10000001100110	-4
20	2 (C)	100	00110000011100	-6		100	10000001110001	-4
		101	00111110000001	-2		101	10000001111000	-4
		102	00111100110000	-2		102	10000011000011	-4
		103	00111100011000	-2		103	10000011000110	-4
		104	00111100001100	-2		104	10000011001100	-4
		105	00111100000110	-2		105	10000011100001	-4
		106	00111100000011	-2		106	10000011110000	-4
		107	00111100111000	-2		107	10000110000011	-4
		108	00111100110001	-2		108	10000110000110	-4
		109	00111100011100	-2		109	10000110001100	-4
		110	00111000011001	-2		110	10000110011000	-4
		111	00111000011100	-2		111	10000111000001	-4
		112	00111000011001	-2		112	10000111100000	-4
		113	00111000001110	-2		113	10001100000011	-4
		114	00111000000111	-2		114	10001100000110	-4
30	2 (C)	115	00111000111000	-2		115	10001100001100	-4
		116	00110011100001	-2		116	10001100011000	-4
		117	00110011001100	-2		117	10001100110000	-4
		118	00110011000110	-2		118	10001110000001	-4
		119	00110011000011	-2		119	10011000000011	-4
		120	00110001111000	-2		120	10011000000110	-4
		121	00110001110001	-2		121	10011000001100	-4
		122	00110001100110	-2		122	10011000011000	-4
		123	00110001100011	-2		123	10011000110000	-4
		124	00110000111000	-2		124	10011001100000	-4
		125	00110000111001	-2		125	10011100000001	-4
		126	00110000110011	-2		126	100000000111000	-6
		127	00110000011110	-2		127	100000001110000	-6
		128	00110000011111	-2		128	100000011100000	-6
45	2 (D)	129	00111111100000	0		129	110000000111111	0
		130	00111111000001	0		130	110000000111110	0
		131	001111110011000	0		131	110000001100111	0
		132	001111110001100	0		132	110000001100011	0

Table 18 (CDS ≤ 0)

Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS
2 (C)	133	00111110000110	0	2 (D)	133	11000001111001	0
	134	00111110000011	0		134	11000001111100	0
	135	00111100111000	0		135	110000011000111	0
2 (C)	136	00111100110001	0		136	110000011001110	0
	137	00111100011100	0		137	110000011000111	0
	138	00111100011001	0		138	11000001100110	0
	139	00111100001110	0		139	110000011110001	0
	140	00111100000111	0		140	110000011111000	0
	141	001111001111000	0		141	1100000110000111	0
	142	001111000111001	0		142	1100000110001110	0
	143	001111000110010	0		143	1100000110011001	0
	144	0011110001100011	0		144	1100000110011100	0
	145	0011110000111100	0		145	1100000111000011	0
	146	001111000111001	0		146	1100000111000110	0
	147	0011110000110011	0		147	1100000111001100	0
	148	0011110000011110	0		148	1100000111100001	0
	149	0011110000011111	0		149	1100000111110000	0
	150	001100011111000	0		150	1100000100000111	0
	151	0011000111110001	0		151	1100000100001110	0
	152	001100011100110	0		152	1100000100011001	0
	153	001100011100011	0		153	1100000100011100	0
	154	001100011001110	0		154	110000010001110001	0
	155	001100011000111	0		155	110000010001110000	0
	156	00110001111100	0		156	1100000110000011	0
	157	001100011111001	0		157	1100000110000110	0
	158	001100001100011	0		158	11000001100001100	0
	159	001100001100111	0		159	1100000110011000	0
	160	001100000111110	0		160	110000011111000001	0
	161	001100000111111	0		161	110000011111000000	0
	162	001100000011001	-2		162	1100000000111000	-2
	163	00110000001110	-2		163	1100000000110011	-2
	164	001100000001111	-2		164	1100000000111001	-2
3 (C)	165	00011110000001	-4	3 (D)	165	1100000000111100	-2
	166	000111000110000	-4		166	1100000001100011	-2
	167	000111000111000	-4		167	1100000001100110	-2
	168	00011100001100	-4		168	1100000001110001	-2
	169	00011100000110	-4		169	1100000001110000	-2
	170	00011100000011	-4		170	1100000001100001	-2
	171	000110001110000	-4		171	1100000011000110	-2
	172	000110001100001	-4		172	1100000011001100	-2
	173	000110000111000	-4		173	1100000011100001	-2
	174	000110000110001	-4		174	1100000011100000	-2
	175	000110000011100	-4		175	1100000011000001	-2
	176	000110000011001	-4		176	1100000011000010	-2
	177	000110000001110	-4		177	1100000011000110	-2
	178	000110000000111	-2		178	1100000010001100	-2
	179	00011111000000	-2		179	11000000111000001	-2
	180	000111110000001	-2		180	11000000111000000	-2
	181	000111110000000	-2		181	110000001100000001	-2
	182	000111100000110	-2		182	11000000000001100	-2
	183	0001111000000110	-2		183	1100011000001100	-2
	184	0001111000000011	-2		184	1100011000011000	-2
	185	000111000011100	-2		185	11000110000110000	-2
	186	000111000011001	-2		186	1100011000000001	-2
	187	0001110000011100	-2		187	1100000000000001	-4
	188	0001110000001101	-2		188	1100000000000000	-4
	189	0001110000000110	-2		189	110000000000000001	-4
	190	0001110000000011	-2		190	110000000000000000	-4
	191	000110001111000	-2		191	1100000000000000001	-4
	192	000110001100001	-2		192	1100000000000000000	-4
	193	000110001100010	-2		193	1100000000000000001	-4
	194	0001100011000011	-2		194	1100000000000000000	-4
	195	000110001111000	-2		195	1100000000000000001	-4
	196	000110000111001	-2		196	1100000000000000000	-4
	197	000110000110011	-2		197	1100000000000000000	-6
	198	000110000011100	-2		198	1100000000000000000	-6
	199	000110000001111	-2		199	1100000000000000000	-6

Table 18 (CDS ≤ 0)

5	Class	8-bit data	Modulation codes beginning with "0"	CDS	Class	8-bit data	Modulation codes beginning with "1"	CDS	
10	3 (C)	200	00011111110000	0	3 (D)	200	11100000001111	0	
		201	00011111110001	0		201	11100000011110	0	
		202	00011111001100	0		202	11100000110011	0	
		203	00011111000110	0		203	111000001111001	0	
		204	00011111000011	0		204	111000001111100	0	
		205	000111100011100	0		205	111000001100011	0	
		206	00011110011001	0		206	11100001100110	0	
		207	00011110001110	0		207	11100001110001	0	
		208	00011110000111	0		208	11100001111000	0	
		209	00011100111100	0		209	11100011000011	0	
		210	000111001111001	0		210	11100011000110	0	
		211	00011100110011	0		211	11100011001100	0	
		212	00011100011110	0		212	11100011100001	0	
		213	00011100001111	0		213	11100011110000	0	
		214	00011001111100	0		214	11100110000011	0	
15	4 (C)	215	000110011111001	0		215	11100110000110	0	
		216	00011001110011	0		216	11100110001100	0	
		217	00011001100111	0		217	11100110011000	0	
		218	00011000111110	0		218	11100111000001	0	
		219	00011000111111	0		219	11100111100000	0	
		220	00001111110000	-2		220	11100000001110	-2	
		221	00001111100001	-2		221	11100000011001	-2	
		222	00001111001100	-2		222	11100000011100	-2	
		223	00001111000110	-2		223	111000000110001	-2	
		224	00001111000011	-2		224	111000000111000	-2	
		225	00001110011100	-2		225	11100001100001	-2	
		226	000011100111001	-2		226	111000011100000	-2	
		227	00001110001110	-2		227	111000110000001	-2	
		228	00001110000111	-2		228	11100011100000	-2	
20	5 (C)	229	00001100111100	-2		229	11100110000001	-2	
		230	000011001111001	-2		230	11100000001100	-4	
		231	00001100110011	-2		231	11100000011000	-4	
		232	00001100011110	-2		232	111000000110000	-4	
		233	00001100001111	-2		233	111000011000000	-4	
		234	00001111110000	0		234	11110000000111	0	
		235	00001111110001	0		235	11110000001110	0	
		236	00001111000110	0		236	111100000011001	0	
		237	00001111000011	0		237	111100000011100	0	
		238	00001111000110	0		238	111100000110001	0	
		239	00001111000011	0		239	111100000111000	0	
25	4 (D)	240	00001110011110	0		240	11110001100001	0	
		241	00001110011111	0		241	111100011100000	0	
		242	00001100111110	0		242	111100110000001	0	
		243	00001100111111	0		243	111100111000000	0	
		244	00000111111000	-2		244	11110000000110	-2	
		245	00000111110001	-2		245	111100000001100	-2	
		246	00000111000110	-2		246	111100000011000	-2	
		247	00000111000011	-2		247	111100000110000	-2	
		248	00000110001111	-2		248	111100001100000	-2	
30	5 (C)	249	00000111111100	0		249	111110000000011	0	
		250	00000111111001	0		250	111110000000110	0	
		251	000001111110011	0		251	1111100000001100	0	
		252	000001111000111	0		252	111110000011000	0	
		253	000001110011111	0		253	111110000110000	0	
		254	000001100111111	0		254	111110001100000	0	
35	5 (D)	6 (C)	255	00000011111110	0	6 (D)	255	111111000000001	0

Patentansprüche

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1. Digitales Modulationsverfahren zum Umsetzen von digitalen 8-Bit-Daten in digitale 14-Bit-Modulationscodes, gekennzeichnet durch:
 1. einen Schritt 1 zum Wählen von bis zu vier digitalen 14-Bit-Modulationscodes für jeden digitalen 8-Bit-Datenwert, wobei der digitale 14-Bit-Modulationscode durch Prozeduren gewählt wird, bei denen
 - (a) aus 2^4 digitalen 14-Bit-Codes ein digitaler Code gewählt wird, in welchem die Anzahl von aufeinanderfolgenden identischen Bits in den ersten 6 Bits 5 oder weniger, von dem 2. Bit bis zu dem 13. Bit 2 bis 7 und in den letzten 7 Bits 6 oder weniger beträgt, wobei der Absolutwert der digitalen Codewortsumme CDS des gewählten digitalen Codes 4 oder weniger beträgt, und diese Wählprozedur wiederholt wird, bis ein digitaler Code gewählt ist, der die obigen Bedingungen erfüllt

holt wird,

(b) aus den bei der Prozedur (a) gewählten digitalen 14-Bit-Codes ein digitaler Code, dessen erstes Bit "0" ist und dessen Wert der digitalen Codewortsumme CDS 0 ist, und der gewählte digitale 14-Bit-Code mit dem Umkehrcode desselben zu einer Gruppe aus 2 digitalen Codes zusammengefaßt wird, oder aus dem aus der Prozedur (a) gewählten digitalen 14-Bit-Codes ein digitaler Code gewählt wird, dessen erstes Bit "1" ist und dessen Wert der digitalen Codewortsumme CDS +2 oder +4 ist, die gewählten digitalen 14-Bit-Codes mit dem Umkehrcodes derselben kombiniert werden und weiterhin die beiden digitalen 14-Bit-Codes mit einem bei der vorangehenden Prozedur gewählten Paar von digitalen 14-Bit-Codes zum Bilden einer Gruppe aus 4 digitalen Codes kombiniert werden und diese Wählprozedur wiederholt wird,

(c) aus den bei der Prozedur (a) gewählten digitalen 14-Bit-Codes ein digitaler Code, dessen erstes Bit "0" ist und dessen Wert der digitalen Codewortsumme CDS +2 ist, und ein anderer digitaler Code gewählt wird, dessen erstes Bit "1" ist und dessen Wert der digitalen Codewortsumme CDS +2 oder +4 ist, die beiden gewählten digitalen 14-Bit-Codes mit deren Umkehrcodes zu einer Gruppe aus 4 digitalen Codes kombiniert werden und diese Wählprozedur wiederholt wird,

(d) aus den bei der Prozedur (a) gewählten digitalen 14-Bit-Codes ein digitaler Code, dessen erstes Bit "0" ist und dessen Wert der digitalen Codewortsumme CDS +4 ist, und ein anderer digitaler Code gewählt wird, dessen erstes Bit "1" ist und dessen Wert der digitalen Codewortsumme CDS +2 ist, die beiden gewählten digitalen 14-Bit-Codes mit deren Umkehrcodes zum Bilden einer Gruppe aus 4 digitalen Codes kombiniert werden und diese Wählprozedur wiederholt wird, und

(e) aus den bei den vorangehenden Prozeduren gebildeten Gruppen als digitale 14-Bit-Modulationscodes 256 Gruppen gewählt werden,

einen Schritt 2, bei dem aus den 256 Gruppen von digitalen 14-Bit-Modulationscodes eine Gruppe von digitalen 14-Bit-Modulationscodes gewählt wird, die dem eingegebenen digitalen 8-Bit-Datenwert entspricht,

einen Schritt 3, bei dem weiterhin in der bei dem Schritt 2 gewählten Gruppe mindestens ein digitaler 14-Bit-Modulationscode gewählt wird, der jeweils der Erfordernis genügt, daß die Anzahl von aufeinanderfolgenden identischen Bits an dem gemeinsamen Abschnitt des schon gewählten vorangehenden digitalen 14-Bit-Modulationscodes und des zu wählenden digitalen 14-Bit-Modulationscodes 2 bis 7 beträgt, und

einen Schritt 4, bei dem aus den bei dem Schritt 3 gewählten Modulationscodes weiterhin ein digitaler 14-Bit-Modulationscodes derart gewählt wird, daß dieser eine digitale 14-Bit-Modulationscode der Erfordernis genügt, daß der Absolutwert des digitalen Bit-Summenwertes DSV für jedes Bit in dem Modulationscode gleich 7 oder geringer ist.

2. Digitales Modulationsverfahren nach Anspruch 1, dadurch gekennzeichnet, daß der Schritt 3 Prozeduren umfaßt, bei denen

dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "10" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "01", "001", "0001", "00001" oder "000001" sind,

dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "01" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "10", "110", "1110", "11110" oder "111110" sind,

dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "100" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "110", "1110", "11110", "111110" oder "01", "001", "0001", "00001" oder "000001" sind,

dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "011" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "001", "0001", "00001", "000001", "10", "110", "1110", "11110" oder "111110" sind,

dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "1000" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "110", "1110", "11110", "111110", "01", "001", "0001" oder "00001" sind,

dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "0111" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "001", "0001", "00001", "000001", "10", "110", "1110" oder "11110" sind,

dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "10000" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "110", "1110", "11110", "111110", "01", "001" oder "0001" sind,

5 dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "01111" endet, irgend einer der digitalen Modulationscodes gewählt wird, dessen erste Bits "001", "0001", "00001", "000001", "10", "110" oder "1110" sind,

10 dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "100000" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "110", "1110", "11110", "111110", "01" oder "001" sind,

15 dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "011111" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "001", "0001", "00001", "000001", "10" oder "110" sind,

20 dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "1000000" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "110", "1110", "11110", "111110" oder "01" sind, und

25 dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "0111111" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "001", "0001", "00001", "000001" oder "10" sind.

3. Digitales Modulationsverfahren nach Anspruch 1, dadurch gekennzeichnet, daß der Schritt 4 Prozeduren umfaßt, bei denen

30 dann, wenn der digitale Summenwert DSV an dem Ende des schon gewählten vorangehenden digitalen 14-Bit-Modulationscodes +2 ist, irgendeiner der digitalen Modulationscodes gewählt wird, dessen Codewortsumme CDS 0, -2 oder -4 ist,

35 dann, wenn der digitale Summenwert DSV an dem Ende des schon gewählten vorangehenden digitalen 14-Bit-Codes 0 ist, irgendeiner der digitalen Modulationscodes gewählt wird, dessen Codewortsumme CDS +2, 0 oder -2 ist, und

40 dann, wenn der digitale Summenwert DSV an dem Ende des schon gewählten vorangehenden digitalen 14-Bit-Modulationscodes -2 ist, irgendeiner der digitalen Modulationscodes gewählt wird, dessen Codewortsumme CDS +4, +2 oder 0 ist.

4. Digitales Modulationsverfahren nach Anspruch 1, dadurch gekennzeichnet, daß die bei dem Schritt 1 erhaltenen digitalen Modulationscodes die in den nachstehenden Tabellen 4 und 5 angeführten Codes oder die durch Ersetzen eines Teils der Tabelle 4 durch die nachstehende Tabelle 12 erhaltenen Codes oder die durch Ersetzen eines Teils der Tabelle 5 durch die nachstehende Tabelle 13 erhaltenen Codes sind.

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Tabelle 4 (CDS ≥ 0)

Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "0"	CDS	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "1"	CDS
5	0	01111110000001	0	0	10000001111110	0	0
	1	01111100110000	0	1	10000011001111	0	0
	2	01111100011000	0	2	10000011100111	0	0
	3	01111100001100	0	3	10000011110011	0	0
10	4	01111100000110	0	4	10000011111001	0	0
	5	01111100000011	0	5	10000011111100	0	0
	6	01111100111000	0	6	10000110001111	0	0
	7	01111100110001	0	7	10000110011110	0	0
	8	01111100011100	0	8	10000111000111	0	0
	9	01111100011001	0	9	10000111001110	0	0
15	10	01111100001110	0	10	10000111100011	0	0
	11	01111100001101	0	11	100001111100110	0	0
	12	01111000001110	0	12	10000111110001	0	0
	13	01111000000111	0	13	10000111111000	0	0
	14	01110011110000	0	14	10001100001111	0	0
20	15	01110011110001	0	15	10001100011110	0	0
	16	01110011001100	0	16	10001100110011	0	0
	17	01110011000110	0	17	100011001111001	0	0
	18	01110011000011	0	18	10001100111100	0	0
	19	01110001111000	0	19	10001110000111	0	0
	20	01110001111001	0	20	10001110001110	0	0
	21	01110001100110	0	21	10001110011001	0	0
	22	01110001100011	0	22	10001110011100	0	0
25	23	01110000111100	0	23	10001111000011	0	0
	24	01110000111101	0	24	10001111000110	0	0
	25	01110000110011	0	25	10001111001100	0	0
	26	01110000011110	0	26	10001111100001	0	0
	27	01110000001111	0	27	10001111110000	0	0
	28	01100111110000	0	28	10011000001111	0	0
30	29	01100111110001	0	29	10011000011110	0	0
	30	01100111001100	0	30	10011000110011	0	0
	31	01100111000110	0	31	10011000111001	0	0
	32	01100111000011	0	32	10011000111100	0	0
	33	01100110011100	0	33	10011001100011	0	0
35	1(A)	01100110011001	0	1(B)	34	10011001100110	0
	34	01100110001110	0		35	10011001110001	0
	36	01100110000111	0		36	10011001111000	0
	37	01100011111000	0		37	10011100000111	0
	38	01100011110001	0		38	10011100001110	0
	39	01100011100110	0		39	10011100011001	0
	40	01100011100011	0		40	10011100011100	0
40	41	01100011001110	0		41	10011100110001	0
	42	01100011000111	0		42	10011100111000	0
	43	01100001111100	0		43	10011110000011	0
	44	011000011111001	0		44	10011110000110	0
	45	01100001110011	0		45	10011110001100	0
	46	01100001100111	0		46	10011110011000	0
	47	01100000111110	0		47	10011111000001	0
45	48	01100000111111	0		48	10011111100000	0
	49	01111111001100	4		49	10000011111110	2
	50	01111111000110	4		50	100000110011111	2
	51	01111111000011	4		51	100000111001111	2
	52	011111110011100	4		52	100000111100111	2
	53	011111110011001	4		53	100000111110011	2
	54	011111110001110	4		54	1000001111111001	2
50	55	011111110000111	4		55	1000001111111100	2
	56	011111100111100	4		56	100011000111111	2
	57	011111100111001	4		57	100011001111110	2
	58	011111100110011	4		58	100011100011111	2
	59	011111100011110	4		59	100011100111110	2
	60	011111100011111	4		60	100011110001111	2
55	61	011111001111100	4		61	100011110011110	2
	62	011111001111001	4		62	100011111000111	2
	63	0111110011110011	4		63	100011111100110	2

Tabelle 4 (CDS ≥ 0)

Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "0"	CDS	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "1"	CDS
5	64	01111001100111	4	64	10001111110001	2	
	65	01111000111110	4	65	10001111111000	2	
	66	01111000011111	4	66	10011000011111	2	
10	67	01110011111100	4	67	10011000111110	2	
	68	011100111111001	4	68	10011001100111	2	
	69	01110011110011	4	69	10011001110011	2	
	70	0111001100111	4	70	10011001111001	2	
	71	01110011001111	4	71	10011001111100	2	
15	72	01110001111110	4	72	10011100001111	2	
	73	01110000111111	4	73	10011100011110	2	
	74	01100111111100	4	74	10011100110011	2	
	75	011001111111001	4	75	100111001111001	2	
	76	01100111110011	4	76	100111001111100	2	
	77	01100111100111	4	77	10011110000111	2	
	78	011001111001111	4	78	10011110001110	2	
20	79	01100110011111	4	79	10011110011001	2	
	80	01100011111110	4	80	100111100111100	2	
	81	01111111000001	2	81	100111110000011	2	
	82	01111110011000	2	82	10011111000110	2	
	83	01111110001100	2	83	10011111001100	2	
	84	01111110000110	2	84	10011111100001	2	
	85	011111110000011	2	85	10011111110000	2	
25	86	011111100111100	2	86	10001111001111	4	
	87	011111100110001	2	87	10001111100111	4	
	88	011111100011100	2	88	10001111110011	4	
	89	011111100011001	2	89	10011001111110	4	
	90	01111100001110	2	90	10011100111110	4	
	91	01111100001111	2	91	10011110001111	4	
30	92	011111001111000	2	92	10011110011110	4	
	93	011111001110001	2	93	10011111000111	4	
	94	011111001100110	2	94	10011111001110	4	
	95	011111001100011	2	95	10011111100011	4	
	96	011111000111100	2	96	10011111100110	4	
35	97	011110001111001	2	97	11000111100111	4	
	98	01111000110011	2	98	11000111110011	4	
	99	01111000011110	2	99	11000000111111	2	
	100	01111000001111	2	100	11000001111110	2	
	101	01110011111000	2	101	11000011001111	2	
	102	01110011110001	2	102	11000011110011	2	
	103	01110011100110	2	103	110000111100011	2	
	104	01110011100011	2	104	11000011111001	2	
40	105	01110011001110	2	105	110000111111100	2	
	106	01110011001111	2	106	11000110001111	2	
	107	01110001111100	2	107	11000110011110	2	
	108	01110001111001	2	108	11000111000111	2	
	109	01110001110011	2	109	11000111001110	2	
	110	01110001100111	2	110	11000111000111	2	
45	111	01110000111110	2	111	11000111100110	2	
	112	01110000111111	2	112	11000111110001	2	
	113	01100111111000	2	113	11000111111000	2	
	114	01100111110001	2	114	11001100001111	2	
	115	011001111100110	2	115	11001100011110	2	
	116	011001111000111	2	116	11001100110011	2	
	117	011001111001110	2	117	11001100111001	2	
	118	011001111000111	2	118	11001100111100	2	
50	119	011001100111110	2	119	11001110000111	2	
	120	011001100011111	2	120	11001110001110	2	
	121	011000111111100	2	121	11001110011001	2	
	122	011000111111001	2	122	11001110011100	2	
	123	011000111110011	2	123	11001111000011	2	
	124	011000111001111	2	124	11001111000110	2	
55	125	011000110011111	2	125	11001111001100	2	
	126	011000011111110	2	126	11001111100001	2	
	127	011000001111111	2	127	11001111110000	2	

Tabelle 4 (CDS ≥ 0)

	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "0"	CDS	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "1"	CDS
5		128	0011111100000	0		128	110000000011111	0
		129	00111111000001	0		129	11000000111110	0
		130	001111110011000	0		130	110000001100111	0
10		131	001111110001100	0		131	110000001110011	0
		132	001111110000110	0		132	110000001111001	0
		133	001111110000011	0		133	110000001111100	0
		134	00111100111000	0		134	11000011000111	0
		135	00111100110001	0		135	11000011001110	0
		136	00111100011100	0		136	11000011100011	0
15		137	00111100011001	0		137	11000011100110	0
		138	00111100001110	0		138	11000011110001	0
		139	00111100000111	0		139	11000011111000	0
		140	00111001111000	0		140	11000110000111	0
		141	00111001110001	0		141	11000110001110	0
20		142	00111001100110	0		142	11000110011001	0
		143	00111001100011	0	2(B)	143	11000110011100	0
		144	00111000111100	0		144	11000111000011	0
		145	001110001111001	0		145	11000111000110	0
		146	00111000110011	0		146	11000111001100	0
		147	00111000011110	0		147	11000111100001	0
		148	00111000001111	0		148	11000111110000	0
		149	00110011111000	0		149	11001100000111	0
25		150	001100111110001	0		150	11001100001110	0
		151	00110011100110	0		151	11001100011001	0
		152	0011001100011	0		152	11001100011100	0
		153	00110011001110	0		153	11001100110001	0
		154	00110011000111	0		154	11001100111000	0
		155	00110001111100	0		155	11001110000011	0
		156	001100011111001	0		156	11001110000110	0
30		157	00110001110011	0		157	11001110001100	0
		158	00110001100111	0		158	11001110011000	0
		159	00110000111110	0		159	11001111000001	0
		160	00110000111111	0		160	11001111100000	0
	2(A)	161	00111111000001	2		161	11001100111110	4
		162	00111111001100	2		162	11001110011110	4
		163	00111111000110	2		163	11001111000111	4
35		164	00111111000011	2		164	11001111100110	4
		165	001111110011100	2		165	11001111110001	4
		166	001111110011001	2		166	110011111100110	4
		167	00111110001110	2		167	11100000111110	4
		168	00111110000111	2		168	11100011100111	4
		169	001111001111100	2		169	111000111110011	4
40		170	0011110011111001	2		170	111000111111100	4
		171	00111100110011	2		171	11100110011110	4
		172	00111100011110	2		172	11100111000111	4
		173	00111100001111	2	3(B)	173	11100111001110	4
		174	001111001111100	2		174	111001111100011	4
		175	0011110011111001	2		175	111001111100110	4
		176	00111100110011	2		176	11100111111000	4
45		177	001111001100111	2		177	11100000111111	2
		178	001111000111110	2		178	111000001111110	2
		179	001111000011111	2		179	11100001100111	2
		180	001110011111100	2		180	111000011100111	2
		181	0011100111111001	2		181	111000011111001	2
		182	0011100111110011	2		182	111000011111100	2
		183	001110011001111	2		183	111000110001111	2
50		184	0011100110011111	2		184	111000110011110	2
		185	00110001111110	2		185	111000111000111	2
		186	00110000111111	2		186	111000111001110	2
		187	00111111100110	4		187	111000111110001	2
		188	00111111100011	4		188	111000111111100	2
55		189	001111111001110	4		189	111001100001111	2
		190	001111110001111	4		190	11100110001110	2
		191	001111110011110	4		191	11100110011001	2

Tabelle 4 (CDS ≥ 0)

	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "0"	CDS	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "1"	CDS
6		192	00111110001111	4		192	11100110011100	2
		193	00111100111110	4		193	11100111000011	2
		194	00111100011111	4		194	11100111000110	2
		195	00111000111110	4		195	11100111001100	2
10	2(A)	196	00111000111111	4		196	11100111100001	2
		197	00110011111110	4		197	11100111110000	2
		198	00011111110000	0		198	11100000001111	0
		199	00011111100001	0		199	11100000011110	0
		200	00011111001100	0		200	11100000110011	0
		201	00011111000110	0		201	111000001111001	0
15		202	00011111000011	0	3(B)	202	111000001111100	0
		203	00011110011100	0		203	11100001100011	0
		204	00011110011001	0		204	11100001100110	0
		205	00011110001110	0		205	11100001110001	0
		206	00011110000111	0		206	11100001111000	0
		207	00011100111100	0		207	11100011000011	0
20		208	000111001111001	0		208	11100011000110	0
		209	000111000110011	0		209	11100011001100	0
		210	00011100011110	0		210	11100011100001	0
		211	00011100001111	0		211	11100011110000	0
		212	00011001111100	0		212	11100110000011	0
		213	000110011111001	0		213	11100110000110	0
		214	00011001110011	0		214	11100110001100	0
25	3(A)	215	00011001100111	0		215	11100110011000	0
		216	00011000111110	0		216	11100111000001	0
		217	00011000011111	0		217	11100111100000	0
		218	00011111110001	2		218	11110001111100	4
		219	00011111100110	2		219	11110011111100	4
		220	00011111100011	2		220	11110000001111	2
30		221	00011111001110	2		221	11110000011110	2
		222	00011111000111	2		222	11110000110011	2
		223	00011110011110	2		223	11110000111001	2
		224	00011110001111	2		224	11110000111100	2
		225	00011100111110	2	4(B)	225	11110001100011	2
		226	00011100011111	2		226	11110001100110	2
		227	00011001111110	2		227	11110001110001	2
35		228	00011000111111	2		228	11110001111000	2
		229	00011111001101	4		229	11110011000011	2
		230	00011111100111	4		230	11110011000110	2
		231	00011111001111	4		231	11110011001100	2
		232	00011110011111	4		232	111100111100001	2
		233	00011100111111	4		233	11110011110000	2
40		234	00001111111000	0		234	11110000000111	0
		235	00001111110001	0		235	11110000000110	0
	4(A)	236	00001111100110	0		236	111100000011001	0
		237	00001111100011	0		237	111100000011100	0
		238	00001111001110	0		238	11110000110001	0
		239	00001111000111	0		239	11110000111000	0
45		240	00001110011110	0		240	11110001100001	0
		241	00001110001111	0		241	11110001110000	0
		242	00001100111110	0		242	11110011000001	0
		243	00001100011111	0		243	11110011110000	0
		244	00001111111001	2		244	11111000000111	2
		245	00001111110011	2		245	111110000001110	2
		246	00001111100111	2		246	111110000011001	2
50		247	00001111001111	2		247	111110000011100	2
		248	00001110011111	2		248	111110000111000	2
		249	00001100111111	2	5(B)	249	111110001110000	2
55	5(A)	250	000001111111100	0		250	111110000000011	0
		251	000001111111001	0		251	111110000000110	0
		252	000001111100111	0		252	111110000001100	0
		253	000001111001111	0		253	111110000110000	0
		254	000001110011111	0		254	111110001100000	0
		255	000001100111111	0		255	111110011000000	0

Tabelle 5 (CDS ≤ 0)

Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "0"	CDS	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "1"	CDS
5	0	01111110000001	0	0	10000001111110	0	
	1	01111100110000	0	1	10000011001111	0	
	2	01111100011000	0	2	10000011100111	0	
	3	01111100001100	0	3	10000011110011	0	
10	4	01111100000110	0	4	10000011111001	0	
	5	01111100000011	0	5	10000011111100	0	
	6	01111100111000	0	6	10000110001111	0	
	7	01111100110001	0	7	10000110011110	0	
	8	01111100011100	0	8	10000111000111	0	
	9	01111100011001	0	9	10000111001110	0	
15	10	01111100001110	0	10	10000111100011	0	
	11	01111100001101	0	11	10000111100110	0	
	12	01111100000110	0	12	10000111110001	0	
	13	01111100000011	0	13	10000111111000	0	
20	14	01110011110000	0	14	10001100001111	0	
	15	01110011110001	0	15	10001100011110	0	
	16	01110011001100	0	16	10001100110011	0	
	17	01110011000110	0	17	10001100111001	0	
	18	01110011000011	0	18	100011000111100	0	
	19	01110001111000	0	19	10001110000111	0	
	20	01110001110001	0	20	100011100011110	0	
	21	01110001100110	0	21	10001110011001	0	
	22	01110001100011	0	22	100011100111100	0	
25	23	01110000111100	0	23	10001111000011	0	
	24	01110000111001	0	24	10001111000110	0	
	25	01110000110011	0	25	10001111001100	0	
	26	01110000011110	0	26	10001111100001	0	
	27	01110000001111	0	27	10001111110000	0	
	28	01100111110000	0	28	10011000001111	0	
30	29	01100111110001	0	29	10011000111110	0	
	30	01100111001100	0	30	10011000110011	0	
	31	01100111000110	0	31	10011000111001	0	
	32	01100111000011	0	32	10011000111100	0	
	33	01100110011100	0	33	10011001100011	0	
35	1(C) 34	01100110011001	0	1(D) 34	10011001100110	0	
	35	01100110001110	0	35	10011001110001	0	
	36	01100110000111	0	36	10011001111000	0	
	37	01100011111000	0	37	10011100001111	0	
	38	01100011110001	0	38	100111000001110	0	
	39	01100011100110	0	39	10011100011001	0	
	40	01100011100011	0	40	100111000111100	0	
40	41	01100011001110	0	41	10011100110001	0	
	42	01100011000111	0	42	10011100111000	0	
	43	01100001111100	0	43	10011110000011	0	
	44	011000011111001	0	44	10011110000110	0	
	45	01100001110011	0	45	10011110001100	0	
	46	01100001100111	0	46	10011110011000	0	
	47	01100000111110	0	47	10011111000001	0	
45	48	01100000011111	0	48	10011111100000	0	
	49	01111100000001	-2	49	10000000110011	-4	
	50	01111001100000	-2	50	10000000111001	-4	
	51	01111000110000	-2	51	10000000111100	-4	
	52	01111000011000	-2	52	10000001100011	-4	
	53	01111000001100	-2	53	10000001100110	-4	
	54	01111000001100	-2	54	10000001110001	-4	
50	55	01111000000011	-2	55	10000001111000	-4	
	56	01110011100000	-2	56	10000011000011	-4	
	57	01110011000001	-2	57	10000011000110	-4	
	58	01110001110000	-2	58	10000011001100	-4	
	59	01110001100001	-2	59	10000011100001	-4	
	60	01110000111000	-2	60	10000011110000	-4	
55	61	01110000110001	-2	61	10000110000011	-4	
	62	01110000011100	-2	62	10000110001100	-4	
	63	01110000011001	-2	63	10000110001100	-4	

Tabelle 5 (CDS ≤ 0)

	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "0"	CDS	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "1"	CDS
5		64	01110000001110	-2		64	10000110011000	-4
		65	01110000000111	-2		65	10000111000001	-4
		66	01100111000000	-2		66	10000111100000	-4
10		67	01100111000001	-2		67	10001100000011	-4
		68	01100110011000	-2		68	10001100000110	-4
		69	01100110001100	-2		69	10001100001100	-4
		70	01100110000110	-2		70	10001100011000	-4
		71	01100110000011	-2		71	10001110011000	-4
		72	01100011110000	-2		72	10001110000001	-4
		73	01100011100001	-2		73	10001111000000	-4
15		74	01100011001100	-2		74	10011000000011	-4
		75	01100011000110	-2		75	10011000000110	-4
		76	01100011000011	-2		76	10011000001100	-4
		77	01100001111000	-2		77	10011000011000	-4
		78	01100001110001	-2		78	10011000110000	-4
20	1(C)	79	01100001100110	-2		79	10011001100000	-4
		80	01100001100011	-2		80	10011100000001	-4
		81	01100000111100	-2		81	10000000111110	-2
		82	01100000111001	-2		82	10000001100111	-2
		83	01100000110011	-2		83	10000001110011	-2
		84	01100000011110	-2		84	10000001111001	-2
		85	01100000011111	-2		85	10000001111100	-2
		86	01110000011000	-4		86	10000011000111	-2
25		87	01110000011000	-4		87	10000011001110	-2
		88	01110000011100	-4		88	10000011100011	-2
		89	01100110000001	-4		89	10000011100110	-2
		90	01100011000001	-4		90	10000011110001	-2
		91	01100001111000	-4		91	10000011111000	-2
		92	01100001100001	-4		92	10000110000111	-2
30		93	01100000111100	-4		93	10000110001110	-2
		94	01100000110001	-4		94	10000110011001	-2
		95	01100000111100	-4		95	10000110011100	-2
		96	01100000011001	-4		96	10000111000011	-2
		97	00111000011000	-4		97	10000111000110	-2
		98	00111000001100	-4	1(D)	98	10000111001100	-2
		99	00111111000000	-2		99	10000111100001	-2
35		100	00111111000001	-2		100	10000111110000	-2
		101	00111100110000	-2		101	10001100000111	-2
		102	00111100011000	-2		102	10001100001110	-2
		103	00111100001100	-2		103	10001100011001	-2
		104	00111100000110	-2		104	10001100011100	-2
		105	00111100000011	-2		105	10001100110001	-2
40		106	00111001110000	-2		106	10001100111000	-2
		107	00111001100001	-2		107	10001110000011	-2
		108	00111000111000	-2		108	10001110000110	-2
		109	00111000110001	-2		109	10001110001100	-2
		110	00111000011100	-2		110	10001110011000	-2
45	2(C)	111	00111000011001	-2		111	10001111000001	-2
		112	00111000001110	-2		112	10001111100000	-2
		113	00111000000111	-2		113	10011000000111	-2
		114	00110011110000	-2		114	10011000001110	-2
		115	00110011100001	-2		115	10011000011001	-2
		116	00110011001100	-2		116	10011000011100	-2
		117	00110011000110	-2		117	10011000110001	-2
		118	00110011000011	-2		118	10011000111000	-2
50		119	00110001111000	-2		119	10011001100001	-2
		120	00110001110001	-2		120	10011001110000	-2
		121	00110001100110	-2		121	10011100000111	-2
		122	00110001100011	-2		122	10011100001110	-2
		123	00110000111100	-2		123	10011100001100	-2
		124	00110000111001	-2		124	10011100011000	-2
55		125	00110000110011	-2		125	10011100110000	-2
		126	00110000011110	-2		126	10011110000001	-2
		127	00110000011111	-2		127	10011110000000	-2

Tabelle 5 (CDS ≤ 0)

	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "0"	CDS	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "1"	CDS
5		128	0011111100000	0		128	11000000011111	0
		129	0011111100001	0		129	110000000111110	0
		130	001111110011000	0		130	110000001100111	0
10		131	001111110001100	0		131	1100000011110011	0
		132	001111110000110	0		132	1100000011111001	0
		133	001111110000111	0		133	1100000011111100	0
		134	001111100111000	0		134	110000110001111	0
		135	001111100110001	0		135	110000110011110	0
		136	001111100011100	0		136	110000111100011	0
		137	001111100011001	0		137	110000111100110	0
15		138	001111100001110	0		138	110000111110001	0
		139	001111100000111	0		139	110000111111000	0
		140	001111001111000	0		140	110001100001111	0
		141	0011110011110001	0		141	110001100011110	0
	2(C)	142	001111001100110	0		142	11000110011001	0
20		143	001111001100011	0		143	110001100111100	0
		144	001111000111100	0		144	110001110000111	0
		145	0011110001111001	0		145	110001110001110	0
		146	001111000110011	0		146	110001111001100	0
		147	001111000011110	0		147	110001111100001	0
		148	001111000001111	0		148	110001111110000	0
		149	001100111111000	0		149	110011000001111	0
		150	0011001111110001	0		150	110011000011110	0
25		151	001100111100110	0		151	110011000110011	0
		152	001100111100011	0		152	110011000111100	0
		153	00110011001110	0		153	11001100110001	0
		154	00110011000111	0		154	11001100111000	0
		155	001100011111100	0		155	11001110000011	0
		156	001100011111001	0		156	11001110000110	0
30		157	001100011100111	0		157	11001110001100	0
		158	001100011001111	0		158	11001110011000	0
		159	001100001111110	0		159	11001111000001	0
		160	001100001111111	0		160	11001111100000	0
		161	001100011000001	-4		161	110000000111110	-2
		162	001100011000001	-4	2(D)	162	110000000110011	-2
35		163	001100001111000	-4		163	1100000001111001	-2
		164	001100000110001	-4		164	1100000001111100	-2
		165	001100000111100	-4		165	1100000001100011	-2
		166	001100000111001	-4		166	1100000001100110	-2
		167	0001111000001	-4		167	110000001110001	-2
		168	00011100011000	-4		168	110000001111000	-2
		169	00011100001100	-4		169	110000011000011	-2
40		170	00011100000011	-4		170	110000011000110	-2
		171	00011000110001	-4		171	110000011001100	-2
		172	000110000111000	-4		172	110000011100001	-2
		173	000110000110001	-4		173	110000011110000	-2
	3(C)	174	000110000011100	-4		174	110000110000011	-2
45		175	000110000011001	-4		175	110000110000110	-2
		176	000110000001111	-4		176	110000110001100	-2
		177	0001111100000	-2		177	1100001100011000	-2
		178	00011111000001	-2		178	110000111000001	-2
		179	000111110001100	-2		179	110000111100000	-2
		180	0001111100001100	-2		180	11001100000011	-2
		181	0001111100000110	-2		181	110011000001110	-2
50		182	0001111000000111	-2		182	1100110000011100	-2
		183	000111000111000	-2		183	110011000011000	-2
		184	000111000110001	-2		184	110011000110000	-2
		185	000111000111100	-2		185	11001110000001	-2
		186	000111000110001	-2		186	11001111000000	-2
		187	000111000011100	-2		187	11000000011001	-4
		188	000111000000111	-2		188	11000000011100	-4
55		189	000110001111000	-2		189	110000000110001	-4
		190	000110001110001	-2		190	1100000001111000	-4
		191	000110001100110	-2		191	1100000001100001	-4

Tabelle 5 (CDS ≤ 0)

Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "0"	CDS	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "1"	CDS	
5	192	00011001100011	-2		192	11000001110000	-4	
	193	00011000111100	-2		193	11000011000001	-4	
	194	00011000111001	-2		194	11000011100000	-4	
10	195	00011000110011	-2		195	11000110000001	-4	
	196	00011000011110	-2	2(D)	196	11000111000000	-4	
	197	00011000001111	-2		197	11001100000001	-4	
	198	00011111110000	0		198	11100000001111	0	
	199	00011111110001	0		199	11100000011110	0	
	200	00011111001100	0		200	11100000110011	0	
15	3(C)	201	00011111000110	0		201	11100000111101	0
	202	00011111000011	0		202	11100000111100	0	
	203	00011110011100	0		203	11100001100011	0	
	204	00011110011001	0		204	11100001100110	0	
	205	00011110001110	0		205	11100001110001	0	
	206	00011110000111	0		206	11100001111000	0	
	207	00011100111100	0		207	11100011000011	0	
20		208	00011100111001	0		208	11100011000110	0
	209	00011100110011	0		209	11100011001100	0	
	210	00011100011110	0		210	11100011100001	0	
	211	00011100001111	0		211	11100111110000	0	
	212	00011001111100	0		212	11100111000011	0	
	213	00011001111001	0		213	11100110000110	0	
	214	00011001110011	0		214	11100110001100	0	
25		215	00011001100111	0	3(D)	215	11100110011000	0
	216	00011000111110	0		216	11100111000001	0	
	217	00011000011111	0		217	11100111100000	0	
	218	00001110000011	-4		218	11100000001110	-2	
30	4(C)	219	00001100000111	-4		219	11100000011001	-2
	220	00001111110000	-2		220	11100000011100	-2	
	221	00001111110001	-2		221	11100000110001	-2	
	222	00001111001100	-2		222	11100000111000	-2	
	223	00001111000110	-2		223	11100000110001	-2	
	224	00001111000011	-2		224	11100000111100	-2	
	225	00001110011100	-2		225	11100011000001	-2	
	226	00001110011001	-2		226	11100011100000	-2	
	227	00001110001110	-2		227	11100110000001	-2	
35		228	00001100000011	-2		228	11100111000000	-2
	229	00001100111100	-2		229	11100000001100	-4	
	230	00001100111001	-2		230	11100000001100	-4	
	231	00001100110011	-2		231	11100000011000	-4	
	232	00001100011110	-2		232	11100001100000	-4	
	233	00001100001111	-2		233	11100011000000	-4	
40		234	0000111111000	0		234	11110000000111	0
	235	00001111110001	0		235	11110000001110	0	
	236	00001111100110	0		236	11110000011001	0	
	237	00001111100011	0		237	11110000011100	0	
	238	00001111001110	0		238	11110000110001	0	
	239	00001111000111	0		239	11110000111000	0	
45		240	00001110011110	0		240	11110000110001	0
	241	00001110001111	0		241	11110001110000	0	
	242	00001100111110	0	4(D)	242	11110011000001	0	
	243	00001100011111	0		243	11110011100000	0	
50	5(C)	244	00000111111000	-2		244	11110000000110	-2
	245	00000111111001	-2		245	11110000001100	-2	
	246	00000111110010	-2		246	11110000011000	-2	
	247	00000111110001	-2		247	11110000110000	-2	
	248	00000111000111	-2		248	11110001100000	-2	
	249	00000110001111	-2		249	11110011000000	-2	
55		250	00000111111100	0		250	11111000000011	0
	251	000001111111001	0		251	11111000000110	0	
	252	0000011111110011	0		252	11111000001100	0	
	253	00000111100111	0	5(D)	253	11111000011000	0	
	254	00000111001111	0		254	11111000110000	0	
	255	00000110011111	0		255	11111001100000	0	

Tabelle 12

5	8-Bit-Datenwert	Modulationscode	CDS
248	11111000110001	2	
249	11111000111000	2	
250	11111001100001	2	
15	251	11111001110000	2

Tabelle 13

20	8-Bit-Datenwert	Modulationscode	CDS
248	00000111001110	-2	
249	00000111000111	-2	
250	00000110011110	-2	
30	251	00000110001111	-2

35 5. Digitales Modulationsverfahren zum Umsetzen von digitalen 8-Bit-Daten in digitale 14-Bit-Modulationscodes, welches
 einen Schritt 1 zum Wählen von bis zu vier digitalen 14-Bit-Modulationscodes für jeden digitalen 8-Bit-Datenwert, wobei der digitale 14-Bit-Modulationscode durch Prozeduren gewählt wird, bei denen
 40 (a) aus den 2^{14} digitalen 14-Bit-Codes ein digitaler Code gewählt wird, in welchem die Anzahl von aufeinanderfolgenden identischen Bits in den ersten 7 Bits 6 oder weniger, von dem zweiten Bit bis zu dem 13. Bit 2 bis 7 und in den letzten 6 Bits 5 oder weniger beträgt, und diese Wählprozedur wiederholt wird,
 (b) aus den bei der Prozedur (a) gewählten digitalen 14-Bit-Codes ein digitaler Code gewählt wird, dessen erstes Bit "0" ist und dessen Codewortsumme CDS einen absoluten Wert gleich 6 oder weniger hat, und diese Wählprozedur wiederholt wird,
 45 (c) aus den bei der Prozedur (a) gewählten digitalen 14-Bit-Codes ein digitaler Code gewählt wird, dessen erstes Bit "1" ist und dessen Codewortsumme CDS einen absoluten Wert gleich 4 oder weniger hat, und diese Wählprozedur wiederholt wird,
 (d) aus den bei der Prozedur (b) gewählten digitalen 14-Bit-Codes ein digitaler Code gewählt wird, dessen Wert der Codewortsumme CDS 0 ist, der gewählte digitale 14-Bit-Code mit dessen Umkehrcode zu einem Paar zusammengefaßt wird, um aus den beiden digitalen Codes eine Gruppe zu bilden, und diese Wählprozedur wiederholt wird,
 50 (e) aus den bei der Prozedur (b) gewählten digitalen 14-Bit-Codes ein digitaler Code gewählt wird, dessen Wert der Codewortsumme CDS +2, +4 oder +6 ist, außer den bei der Prozedur (c) gewählten digitalen 14-Bit-Codes ein digitaler Code gewählt wird, dessen Wert der Codewortsumme CDS +2 oder +4 ist, die beiden gewählten digitalen 14-Bit-Codes mit deren Umkehrcodes kombiniert werden, um aus den 4 digitalen Codes eine Gruppe zu bilden, und diese Wählprozedur wiederholt wird, und
 55 (f) aus den bei den vorangehenden Prozeduren gebildeten Gruppen 256 Gruppen als digitale 14-Bit-

Modulationscodes gewählt werden,

einen Schritt 2 zum Wählen einer Gruppe von digitalen 14-Bit-Modulationscodes aus den 256 Gruppen der digitalen 14-Bit-Modulationscodes, wobei die gewählte Gruppe dem eingegebenen digitalen 8-Bit-Datenwert entspricht,

einen Schritt 3 zum weiteren Wählen von mindestens einem digitalen 14-Bit-Modulationscode in der bei dem Schritt 2 gewählten Gruppe, wobei der jeweilige digitale 14-Bit-Modulationscode der Erfordernis genügt, daß an dem Anschlußabschnitt des schon gewählten vorangehenden digitalen 14-Bit-Modulationscodes und des zu wählenden digitalen 14-Bit-Modulationscodes die Anzahl von aufeinanderfolgenden identischen Bits 2 bis 7 ist, und

einen Schritt 4 zum weiteren Wählen eines digitalen 14-Bit-Modulationscodes aus den bei dem Schritt 3 gewählten Modulationscodes in der Weise umfaßt, daß dieser eine digitale 14-Bit-Modulationscode der Erfordernis genügt, daß der Absolutwert des digitalen Bit-Summenwertes DSV für jedes Bit in dem Modulationscode gleich 8 oder weniger ist.

15 6. Digitales Modulationsverfahren nach Anspruch 5, bei dem der Schritt 3 Prozeduren umfaßt, bei denen dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "10" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "01", "001", "0001", "00001", "000001" oder "0000001" sind,

dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "01" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "10", "110", "1110", "11110", "111110" oder "1111110" sind,

dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "100" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "110", "1110", "11110", "111110", "1111110", "01", "001", "0001", "00001" oder "000001" sind,

dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "011" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "001", "0001", "00001", "000001", "0000001", "10", "110", "1110", "11110" oder "111110" sind,

dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "1000" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "110", "1110", "11110", "111110", "1111110", "01", "001", "0001" oder "00001" sind,

dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "0111" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "001", "0001", "00001", "000001", "0000001", "10", "110", "1110" oder "11110" sind,

dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "10000" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "110", "1110", "11110", "111110", "1111110", "01", "001", "0001", "00001" oder "000001" sind,

dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "01111" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "001", "0001", "00001", "000001", "0000001", "10", "110" oder "1110" sind,

dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "100000" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "110", "1110", "11110", "111110", "1111110", "01" oder "001" sind, und

dann, wenn der schon gewählte vorangehende digitale Modulationscode mit "011111" endet, irgendeiner der digitalen Modulationscodes gewählt wird, dessen erste Bits "001", "0001", "00001", "000001", "0000001", "10" oder "110" sind.

7. Digitales Modulationsverfahren nach Anspruch 5, bei dem der Schritt 4 Prozeduren umfaßt, bei denen dann, wenn der digitale Summenwert DSV an dem Ende des schon gewählten vorangehenden digitalen 14-Bit-Codes +4 oder +2 ist, irgendeiner der digitalen Modulationscodes gewählt wird, dessen Codewortsumme CDS 0, -2, -4 oder -6 ist,

dann, wenn der digitale Summenwert DSV an dem Ende des schon gewählten vorangehenden digitalen 14-Bit-Modulationscodes 0 ist, irgendeiner der digitalen Modulationscodes gewählt wird, dessen Codewortsumme CDS +4, +2, 0, -2 oder -4 ist, und

dann, wenn der digitale Summenwert DSV an dem Ende des schon gewählten vorangehenden digitalen 14-Bit-Modulationscodes -2 oder -4 ist, irgendeiner der digitalen Modulationscodes gewählt wird, dessen Codewortsumme CDS +6, +4, +2, oder 0 ist.

8. Digitales Modulationsverfahren nach Anspruch 5, bei dem die digitalen Modulationscodes die in den nach-

stehenden Tabellen 17 und 18 aufgeführten Codes sind.

Tabelle 17 (CDS ≥ 0)

Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "0"	CDS	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "1"	CDS			
5										
10		0 01111110000001 1 01111100110000 2 01111100011000 3 01111100001100 4 01111100000110 5 01111100000011 6 01111000110000 7 01111000110001 8 01111000111000 9 01111000110001 10 01111000011100 11 01111000110001 12 01111000001110 13 01111000000111 14 01110011100000 15 01110011100001 16 01110011001100 17 01110011000110 18 01110011000011 19 01110001111000 20 01110001110001 21 01110001100110 22 01110001100011 23 01110001111000 24 01110000111001 25 01110000110011 26 01110000111100 27 01110000011111 28 01100111110000 29 01100111100001 30 01100110011000 31 01100110001100 32 01100110000111 33 01100110011100 34 01100110011001 35 01100110001110 36 01100110000111 37 01100011111000 38 01100011110001 39 01100011100110 40 01100011100011 41 01100011001110 42 01100011000111 43 01100001111000 44 01100001111001 45 01100001110011 46 01100001100111 47 01100001111000 48 01100000111111 49 01111110000001 50 01111110011000 51 011111100001100 52 01111110000110 53 01111110000011 54 01111100111000 55 01111100011001 56 01111100011100 57 01111100011001 58 01111100011100 59 01111100001111 60 01111001111000 61 01111001110001 62 01111001100110 63 01111001100011 64 01111000111100 65 01111000111001 66 01111000110011	0	10000001111110 1 10000011001111 2 100000111000111 3 10000011110011 4 10000011111001 5 10000011111100 6 10000110001111 7 10000110011110 8 10000111000111 9 10000111001110 10 10000111100011 11 10000111100110 12 10000111100001 13 10000111111000 14 10001100001111 15 10001100011110 16 10001100110011 17 10001100111101 18 10001100111100 19 10001110000111 20 10001110001110 21 10001110011001 22 10001110011100 23 10001111000011 24 10001111000110 25 10001111001100 26 10001111000001 27 10001111100000 28 10011000001111 29 10011000001110 30 10011000110011 31 10011000111001 32 10011000111100 33 10011001100011 34 10011001100110 35 10011001110001 36 10011001111000 37 10011100000111 38 10011100001110 39 10011100011001 40 10011100011100 41 10011100110001 42 10011100111000 43 10011100000111 44 10011110000110 45 100111100001100 46 10011110011000 47 10011110000001 48 10011111000000 49 10000011111110 50 10000110011111 51 10000111001111 52 10000111100111 53 10000111110011 54 10000111111001 55 10000111111100 56 10001100011111 57 10001100111110 58 10001110001111 59 10001110011110 60 10001111000111 61 10001111001110 62 10001111000011 63 10001111001100 64 10001111100011 65 10001111111000 66 10011000011111	0	0	0	0	0	0

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Tabelle 17 (CDS ≥ 0)

5	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "0"	CDS	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "1"	CDS
10		67	0111000011110	2		67	1001100011110	2
		68	011100001111	2		68	1001100110011	2
		69	0111001111000	2		69	1001100111001	2
		70	01110011110001	2		70	10011001111001	2
		71	01110011110010	2		71	1001100111100	2
		72	01110011110011	2		72	1001110001111	2
		73	0111001100110	2		73	1001110001110	2
		74	0111001100011	2		74	1001110011001	2
		75	0111000111100	2		75	10011100111001	2
		76	01110001111001	2		76	1001110011100	2
		77	011100011110011	2	1 (B)	77	1001111000111	2
		78	01110001100111	2		78	10011110001110	2
		79	0111000011110	2		79	10011110011001	2
		80	0111000011111	2		80	10011110011100	2
		81	0110011111000	2		81	10011111000011	2
		82	01100111110001	2		82	10011111000110	2
		83	01100111110010	2		83	10011111001100	2
		84	011001111100011	2		84	10011111100001	2
		85	0110011100110	2		85	10011111110000	2
20	1 (A)	86	01100111000111	2		86	10011111000111	4
		87	0110011001110	2		87	1100001111110	4
		88	0110011000111	2		88	11000110011111	4
		89	0110001111100	2		89	11000111001111	4
		90	01100011111001	2		90	11000111100111	4
		91	011000111110011	2		91	11000111110011	4
		92	0110001100111	2		92	11000111111001	4
		93	01100011001111	2		93	11000111111100	4
		94	0110000111110	2		94	11001100011111	4
		95	0111111100110	4		95	11001100111110	4
		96	0111111100010	4		96	11001110001111	4
		97	01111111000011	4		97	11001110011110	4
		98	01111111001110	4		98	11001111000111	4
		99	01111111001101	4		99	11001111001110	4
30		100	01111111000110	4		100	11001111100011	4
		101	011111110000111	4		101	11000011111110	2
		102	01111100111100	4		102	110000110011111	2
		103	011111001111001	4		103	110000111100111	2
		104	0111110011110011	4		104	1100001111100111	2
		105	01111100011110	4		105	110000111111001	2
		106	01111100001111	4		106	1100001111111100	2
		107	01111001111100	4	2 (B)	107	11000110001111	2
		108	011110011111001	4		108	11000110011110	2
		109	01111001110011	4		109	11000111000111	2
		110	01111001100111	4		110	11000111001110	2
		111	01111000111110	4		111	11000111100011	2
		112	01111000111111	4		112	11000111100110	2
		113	01110011111100	4		113	11000111110001	2
		114	011100111111001	4		114	11000111111000	2
		115	0111001111110011	4		115	11001100001111	2
		116	01110011100111	4		116	11001100011110	2
		117	01110011001111	4		117	11001100110011	2
		118	01110001111110	4		118	11001100111001	2
		119	011001111111100	4		119	11001100111100	2
		120	0110011111111001	4		120	11001110000111	2
		121	01100111111110011	4		121	11001110001110	2
		122	011001111001111	4		122	11001110011001	2
		123	011001110011111	4		123	110011100111100	2
		124	011001100111111	4		124	11001111000011	2
		125	011000111111110	4		125	11001111000110	2
		126	01111111000111	6		126	110011111001100	2
		127	011111110001111	6		127	11001111100001	2
		128	011111100011111	6		128	11001111110000	2
50		129	00111111100000	0		129	11000000011111	0
		130	00111111000001	0		130	11000000111110	0
		131	001111110011000	0		131	11000001100111	0
		132	001111110001100	0		132	11000001110011	0
	2 (A)	133	001111110000110	0		133	11000001111001	0

Tabelle 17 (CDS ≥ 0)

	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "0"	CDS	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "1"	CDS
5								
10		134	00111110000011	0		134	11000001111100	0
		135	00111100111000	0		135	110000011000111	0
		136	001111000110001	0		136	110000011001110	0
		137	001111000011100	0		137	110000011100011	0
		138	00111100011001	0		138	110000011100110	0
		139	001111000011100	0		139	110000011110001	0
		140	001111000001111	0		140	110000011110000	0
		141	00111001111000	0		141	110001100001111	0
		142	001110011100001	0		142	11000110001110	0
		143	00111001100110	0		143	11000110011001	0
		144	001110011000011	0		144	110001100111100	0
		145	00110001111100	0		145	110001110000011	0
		146	00111000111001	0	2 (B)	146	110001110001110	0
		147	00111000110011	0		147	11000111001100	0
		148	00111000011110	0		148	11000111100001	0
		149	00111000001111	0		149	11000111110000	0
		150	00110011111000	0		150	11001100000111	0
		151	00110011110001	0		151	110011000011110	0
		152	00110011001110	0		152	11001100011001	0
		153	00110011000011	0		153	11001100011100	0
		154	00110011001110	0		154	11001100110001	0
		155	00110011000111	0		155	11001100111000	0
		156	00110001111100	0		156	11001110000011	0
		157	00110001110001	0		157	11001110000110	0
		158	00110001110011	0		158	11001110001100	0
		159	00110001100111	0		159	11001110011000	0
		160	00110000111110	0		160	11001111000001	0
		161	00110000011111	0		161	11001111100000	0
		162	00111111100001	2		162	11001111100110	4
		163	00111111100110	2		163	11001111110001	4
		164	00111111000110	2		164	11001111111000	4
		165	00111111000011	2		165	11100001111110	4
		166	00111110011100	2		166	11100011001111	4
		167	00111110011001	2		167	111000111100111	4
		168	00111110001110	2		168	111000111110011	4
		169	00111110000111	2		169	111000111111001	4
		170	001111001111100	2		170	111000111111100	4
		171	00111100111001	2		171	111001100011111	4
		172	00111100110011	2		172	111001100111110	4
		173	00111100011110	2		173	111001110001111	4
		174	00111100001111	2		174	11100111001110	4
		175	0011110001111100	2		175	111001111000011	4
		176	0011110001111001	2		176	111001111100110	4
		177	0011110001110011	2		177	111001111110001	4
		178	0011110001100111	2		178	111001111111000	4
		179	001111000111110	2		179	111000000111111	2
		180	001111000011111	2		180	111000001111110	2
		181	0011110001111100	2		181	111000011000111	2
		182	001110011111001	2		182	111000011110011	2
		183	001110011110011	2		183	111000011111001	2
		184	001110011001111	2		184	111000011111100	2
		185	001110011001111	2		185	111000110001111	2
		186	001110001111110	2		186	111000110011110	2
		187	001111111001110	4		187	111000111000111	2
		188	001111111000111	4		188	111000111100110	2
		189	001111111001110	4		189	111000111110001	2
		190	001111111000111	4		190	111000111111000	2
		191	001111110011110	4		191	11100110001111	2
		192	001111110001111	4		192	111001100011110	2
		193	00111110011110	4		193	11100110011001	2
		194	00111100011111	4		194	111001100111100	2
		195	001111001111110	4		195	111001110000111	2
		196	001110011111110	4		196	111001110001110	2
		197	001111111001111	6		197	111001110011100	2
		198	001111111001111	6		198	11100111100001	2
		199	001111110011111	6		199	11100111110000	2

Tabelle 17 (CDS ≥ 0)

Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "0"	CDS	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "1"	CDS		
5		200 00011111110000 201 00011111100001 202 00011111001100 203 00011111000110 204 00011111000011 205 00011111001100 206 00011110011001 207 00011110001110 208 00011110000111 209 00011100111000 210 00011100110001 211 00011100110011 212 00011100011110 213 00011100001111 214 00011001111100 215 00011001111001 3 (A) 216 00011001110011 217 00011000110011 218 00011000111100 219 00011000011111 220 00011111110001 221 00011111100010 222 00011111100011 223 00011111001110 224 00011111000111 225 00011111001110 226 00011110001111 227 00011100111110 228 00011100011111 229 00011001111110 230 00011111100010 231 00011111100111 232 00011111001111 233 00011110011111 30 234 00001111110000 235 00001111110001 236 00001111110010 237 00001111110011 238 00001111001110 239 00001111000111 240 00001110011110 241 00001110001111 242 00001100111110 243 00001100011111 244 0000111111001 245 00001111110011 246 00001111100111 247 00001111001111 248 00001100111111 35 4 (A) 249 00000111111100 250 00000111111001 251 00000111110011 252 00000111100111 253 00000111001111 254 00000110011111 40 5 (A) 255 00000011111110 45 6 (A) 255 00000011111110	0		200 11100000001111 201 11100000001110 202 11100000110011 203 11100000111001 204 11100000111100 205 111000001100011 206 111000001100110 207 111000001100001 208 111000001111000 209 11100011000011 210 11100011000110 211 11100011001100 212 11100011100001 213 11100011110000 214 11100110000011 215 11100110000110 216 11100110001100 217 11100110011000 218 11100111000001 219 11100111100000 220 11110000001111 221 11110000001110 222 11110000110011 223 11110000111001 224 11110000111100 225 111100001100011 226 11110000110010 227 11110000110001 228 11110000111000 229 111100011000011 230 111100011000110 231 111100011001100 232 111100011100001 233 111100011110000 234 11110000000111 235 111100000001110 236 11110000011001 237 11110000011100 238 11110000110001 239 11110000111000 240 11110001100001 241 11110001110000 242 11110001100001 243 11110001110000 244 11111000000111 245 111110000011100 246 111110000110001 247 11111000111000 248 111110001110000 249 11111000000011 250 111110000000110 251 11111000001100 252 111110000011000 253 11111000110000 254 111110001100000 6 (B) 255 11111100000001	0		0	

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Tabelle 18 (CDS ≤ 0)

Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "0"	CDS	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "1"	CDS
5	1 (C)	0	01111110000001	0	0	10000001111110	0
		1	01111100110009	0	1	10000011001111	0
		2	01111100011000	0	2	10000011000111	0
		3	01111100001100	0	3	10000011110011	0
		4	01111100000110	0	4	10000011111001	0
		5	01111100000011	0	5	10000011111100	0
		6	01111001110000	0	6	10000110001111	0
		7	01111001110001	0	7	10000110011110	0
		8	01111000111000	0	8	10000111000111	0
		9	01111000110001	0	9	10000111001110	0
		10	01111000011100	0	10	10000111100011	0
		11	01111000011001	0	11	10000111100110	0
		12	01111000001110	0	12	10000111110001	0
		13	01111000000111	0	13	10000111111000	0
		14	01110011111000	0	14	10001100001111	0
		15	01110011100001	0	15	10001100011110	0
		16	01110011000110	0	16	10001100110011	0
		17	01110011000110	0	17	10001100111101	0
		18	01110011000011	0	18	10001100111100	0
		19	01110001111000	0	19	10001110000111	0
		20	01110001110001	0	20	10001110001110	0
		21	01110001100110	0	21	10001110011001	0
		22	01110001100011	0	22	10001110011100	0
		23	01110000111100	0	23	10001111000011	0
		24	01110000111001	0	24	10001111000010	0
		25	01110000110011	0	25	10001111001100	0
		26	01110000011110	0	26	10001111100001	0
		27	01110000011111	0	27	10001111110000	0
		28	01100111111000	0	28	10011000001111	0
		29	01100111100001	0	29	10011000011110	0
		30	01100111000110	0	30	10011000110011	0
		31	01100111000010	0	31	10011000111001	0
		32	01100111000011	0	32	10011000111100	0
		33	01100110011100	0	33	10011000111001	0
		34	01100110011001	0	34	10011000110010	0
		35	01100110001110	0	35	10011000111001	0
		36	01100110000111	0	36	10011000111100	0
		37	01100011111000	0	37	10011000001111	0
		38	01100011110001	0	38	10011000001110	0
		39	01100011100010	0	39	10011000011001	0
		40	01100011100001	0	40	10011000011100	0
		41	01100011001110	0	41	10011000110001	0
		42	01100011000111	0	42	10011000111100	0
		43	01100011111000	0	43	10011110000011	0
		44	01100001111001	0	44	10011110000110	0
		45	01100001110011	0	45	100111100001100	0
		46	01100001100111	0	46	10011110011000	0
		47	01100000111110	0	47	10011111000001	0
		48	01100000111111	0	48	10011111000000	0
		49	01111100000001	-2	49	10000001111110	-2
		50	01111001100000	-2	50	10000001100011	-2
		51	01111000110000	-2	51	10000001110011	-2
		52	01111000011000	-2	52	10000001111001	-2
		53	01111000001100	-2	53	10000001111100	-2
		54	01111000000110	-2	54	10000011000111	-2
		55	01111000000011	-2	55	10000011001110	-2
		56	01110011100000	-2	56	10000011100011	-2
		57	01110011100001	-2	57	10000011100110	-2
		58	01110001110000	-2	58	10000011110001	-2
		59	01110001100001	-2	59	10000011111000	-2
		60	01110001111000	-2	60	10000110000111	-2
		61	01110000110001	-2	61	10000110001110	-2
		62	01110000011100	-2	62	10000110011001	-2
		63	01110000011001	-2	63	10000110011100	-2
		64	01110000001110	-2	64	10000111000011	-2
		65	01110000000111	-2	65	10000111000110	-2
		66	01110011110000	-2	66	10000111001100	-2

Tabelle 18 (CDS ≤ 0)

Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "0"	CDS	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "1"	CDS
5		67 01100111000001 68 01100110011000 69 01100110001100 70 01100110000110 71 01100110000011 72 01100011110000 73 01100011100001 74 01100011001100 75 01100011000110 76 01100011000011 77 01100001111000 78 01100001110001 79 01100001100110 80 01100001100011 81 01100001111100 82 01100000111001 83 01100000110011 84 01100000111100 85 01100000111101 86 01100000111000	-2		67 100001111100001 68 100001111100000 69 1000011000000111 70 1000011000001110 71 100001100011001 72 100001100011100 73 100001100110001 74 100001100111000 75 1000011100000011 76 100001110000110 77 1000011100001100 78 100001110011000 79 100001111000001 80 100001111100000 81 10011000000111 82 10011000001110 83 10011000011001 84 10011000011100 85 10011000110001 86 10011000111000	-2	
10		87 00111100000001 88 00111001100000 89 00111000110000 90 00111000011000 91 00111000001100 92 00111000000110 93 00111000000011 94 00110001110000 95 00110011000001 96 00110001110000 97 00110001100001 98 00110000111000 99 00110000110001	-4	1 (D)	87 10011001100001 88 10011001110000 89 10011100000011 90 10011100000110 91 10011100001100 92 10011100011000 93 10011100110000 94 10011110000001 95 10000000110011 96 10000000111001 97 10000000111100 98 10000000110001 99 10000000110010	-2	
15		100 0011000011100 101 00111100000001 102 00111100011000 103 00111100011000 104 00111100001100 105 00111100000110 106 00111100000011 107 00111001110000 108 00111001100001 109 00111000111000 110 00111000110001 111 00111000011100 112 00111000011001 113 00111000001110 114 00111000000111 115 00110011110000 116 00110011100001 117 00110011001100 118 00110011000110 119 00110011000011 120 00110001111000 121 00110001110001 122 00110001100110 123 00110001100011 124 00110000111100 125 00110000111001 126 00110000110011 127 00110000011110 128 00110000011111 129 00111111000000	-4	100 10000011100001 101 10000001111000 102 100000110000011 103 10000011000110 104 10000011001100 105 100000111000001 106 100000111100000 107 100001100000011 108 10000110000110 109 10000110001100 110 10000110011000 111 10000111000001 112 100001111000000 113 10001100000011 114 100011000000110 115 10001100001100 116 10001100011000 117 10001100110000 118 10001110000001 119 10011000000011 120 10011000000110 121 10011000001100 122 10011000011000 123 10011000110000 124 10011001100000 125 10011100000001 126 10000000111000 127 10000001110000 128 10000011100000	-4		
20		130 00111110000001 131 00111110001100 132 00111110001100	0	129 11000000011111 130 110000000111110 131 11000001100111 132 11000001100011	0	1 (D)	0
25							
30							
35							
40							
45							
50							

Tabelle 18 (CDS ≤ 0)

Tabelle 18 (CDS ≤ 0)

	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "0"	CDS	Klasse	8-Bit-Daten	Modulationscodes, beginnend mit "1"	CDS
5	3 (C)	200	0001111110000	0	3 (D)	200	11100000001111	0
		201	0001111110001	0		201	11100000011110	0
		202	00011111001100	0		202	111000000110011	0
		203	00011111000110	0		203	111000000111001	0
		204	00011111000011	0		204	111000000111100	0
		205	00011110011100	0		205	111000001100011	0
		206	00011110011001	0		206	111000001100110	0
		207	00011110001110	0		207	111000001110001	0
		208	00011110000111	0		208	111000001111000	0
		209	000111100111100	0		209	111000110000111	0
		210	000111001111001	0		210	11100011000110	0
		211	000111001100111	0		211	11100011001100	0
		212	00011100011110	0		212	11100011100001	0
		213	00011100001111	0		213	11100011110000	0
		214	00011001111100	0		214	111001100000011	0
10	4 (C)	215	000110011111001	0		215	11100110000110	0
		216	000110011110011	0		216	111001100001100	0
		217	000110011001111	0		217	11100110011000	0
		218	00011000111110	0		218	11100111000001	0
		219	000110000111111	0		219	111001111000000	0
		220	0000111111000	-2	4 (D)	220	11100000001110	-2
		221	00001111110001	-2		221	11100000011001	-2
		222	000011110001100	-2		222	111000000111100	-2
		223	000011110000110	-2		223	11100000110001	-2
		224	000011110000011	-2		224	111000001111000	-2
		225	000011100111100	-2		225	11100001100001	-2
		226	000011100111001	-2		226	11100001110000	-2
		227	00001110001110	-2		227	11100011000001	-2
		228	000011100001111	-2		228	11100011100000	-2
		229	000011001111100	-2		229	11100110000001	-2
		230	000011001111001	-2		230	11100000001100	-4
		231	000011001100111	-2		231	11100000011000	-4
		232	00001100011110	-2		232	111000000110000	-4
		233	000011000011111	-2		233	111000011000000	-4
15	5 (C)	234	00001111111000	0		234	111100000000111	0
		235	00001111110001	0		235	11110000001110	0
		236	000011111000110	0		236	111100000011001	0
		237	000011111000011	0		237	11110000011100	0
		238	000011110001110	0		238	111100000110001	0
		239	000011110000111	0		239	111100000111000	0
		240	00001110011110	0		240	111100001100001	0
		241	000011100011111	0		241	111100011100000	0
		242	000011001111110	0		242	111100011000001	0
		243	000011000111111	0		243	111100111100000	0
		244	00000111111000	-2	5 (D)	244	111100000000110	-2
		245	000001111100011	-2		245	11110000001100	-2
		246	0000011110001110	-2		246	111100000011000	-2
		247	0000011110000111	-2		247	111100001100000	-2
		248	000001100001111	-2		248	111100011000000	-2
		249	00000111111100	0		249	111110000000011	0
20	6 (C)	250	000001111111001	0		250	111110000000110	0
		251	000001111100011	0		251	111110000001100	0
		252	0000011111000111	0		252	111110000011000	0
		253	000001110001111	0		253	111110000110000	0
		254	000001100111111	0		254	111110001100000	0
		255	000000111111110	0		255	111111000000001	0
25	5 (C)	256	0000001100111111	0	8 (D)	256	1111110000000001	0
		257	00000011000111111	0		257	11111100000000001	0
		258	000000110000111111	0		258	111111000000000001	0
		259	0000001100000111111	0		259	1111110000000000001	0
		260	00000011000000111111	0		260	11111100000000000001	0
		261	000000110000000111111	0		261	111111000000000000001	0
30	4 (C)	262	0000001100000000111111	0	4 (D)	262	1111110000000000000001	0
		263	00000011000000000111111	0		263	11111100000000000000001	0
		264	000000110000000000111111	0		264	111111000000000000000001	0
		265	0000001100000000000111111	0		265	1111110000000000000000001	0
		266	00000011000000000000111111	0		266	11111100000000000000000001	0
		267	000000110000000000000111111	0		267	111111000000000000000000001	0
35	5 (C)	268	0000001100000000000000111111	0	5 (D)	268	1111110000000000000000000001	0
		269	000000110000000000000001111111	0		269	11111100000000000000000000001	0
		270	00000011000000000000000011111110	0		270	111111000000000000000000000001	0
		271	000000110000000000000000011111100	0		271	1111110000000000000000000000001	0
		272	0000001100000000000000000011111000	0		272	11111100000000000000000000000001	0
		273	00000011000000000000000000011110000	0		273	111111000000000000000000000000001	0
40	6 (C)	274	000000110000000000000000000011111	0	8 (D)	274	1111110000000000000000000000000001	0
		275	00000011000000000000000000000111111	0		275	11111100000000000000000000000000001	0
		276	0000001100000000000000000000001111111	0		276	111111000000000000000000000000000001	0
		277	000000110000000000000000000000011111110	0		277	1111110000000000000000000000000000001	0
		278	00000011000000000000000000000000111111100	0		278	11111100000000000000000000000000000001	0
		279	0000001100000000000000000000000001111111000	0		279	111111000000000000000000000000000000001	0
45	5 (C)	280	000000110000000000000000000000000011111111	0	8 (D)	280	1111110000000000000000000000000000000001	0
		281	00000011000000000000000000000000000111111110	0		281	11111100000000000000000000000000000000001	0
		282	0000001100000000000000000000000000001111111100	0		282	111111000000000000000000000000000000000001	0
		283	000000110000000000000000000000000000011111111000	0		283	1111110000000000000000000000000000000000001	0
		284	00000011000000000000000000000000000000111111110000	0		284	11111100000000000000000000000000000000000001	0
		285	0000001100000000000000000000000000000001111111100000	0		285	111111000000000000000000000000000000000000001	0

Revendications

1. Un procédé de modulation numérique pour convertir des données numériques à 8 bits en codes de modulation numériques à 14 bits, ce procédé de modulation numérique étant caractérisé en ce qu'il comprend :

une étape 1 pour sélectionner jusqu'à quatre codes de modulation numériques à 14 bits pour chaque donnée numérique à 8 bits, le code de modulation numérique à 14 bits étant sélectionné par les procédures suivantes :

(a) on sélectionne parmi les 2^{14} codes numériques à 14 bits un code numérique dans lequel les nombres de bits identiques consécutifs sont égaux à 5 ou moins dans les 6 premiers bits, à 2 à 7 du second bit

au 13-ième bit, et à 6 ou moins dans les 7 derniers bits, la valeur absolue de la CDS (somme numérique de mot de code) du code numérique sélectionné étant égale à 4 ou moins, et on répète cette procédure de sélection,

- 5 (b) on sélectionne parmi les codes numériques à 14 bits sélectionnés dans la procédure (a), un code numérique dont le premier bit est "0", et dont la valeur de CDS est 0, et on combine le code numérique à 14 bits sélectionné avec son code inversé, pour former un groupe avec les 2 codes numériques, ou bien on sélectionne parmi les codes numériques à 14 bits sélectionnés à la procédure (a), un code numérique dont le premier bit est "1", et dont la valeur de CDS est égale à +2 ou +4, on combine les codes numériques à 14 bits sélectionnés avec leurs codes inversés, et on combine en outre les deux codes numériques à 14 bits avec une paire de codes numériques à 14 bits sélectionnés à la procédure ci-dessus, pour former un groupe avec les 4 codes numériques, et on répète cette procédure de sélection,
- 10 (c) on sélectionne parmi les codes numériques à 14 bits sélectionnés à la procédure (a), un code numérique dont le premier bit est "0", et dont la valeur de CDS est égale à +2, et un autre code numérique dont le premier bit est "1", et dont la valeur de CDS est égale à +2 ou +4, et on combine les deux codes numériques à 14 bits sélectionnés avec leurs codes inversés, pour former un groupe avec les 4 codes numériques, et on répète cette procédure de sélection,
- 15 (d) on sélectionne parmi les codes numériques à 14 bits sélectionnés à la procédure (a), un code numérique dont le premier est bit est "0", et dont la valeur de CDS est égale à +4, et un autre code numérique dont le premier bit est "1" et dont la valeur de CDS est égale à +2, et on combine les deux codes numériques à 14 bits sélectionnés avec leurs codes inversés, pour former un groupe avec les 4 codes numériques, et on répète cette procédure de sélection, et
- 20 (e) on sélectionne pour les codes de modulation numériques à 14 bits 256 groupes parmi les groupes formés dans les procédures ci-dessus;

une étape 2 pour sélectionner un groupe de codes de modulation numériques à 14 bits parmi les 256 groupes de codes de modulation numériques à 14 bits, le groupe sélectionné correspondant à une donnée numérique à 8 bits appliquée en entrée;

une étape 3 pour sélectionner en outre un ou plusieurs codes de modulation numériques à 14 bits dans le groupe sélectionné à l'étape 2, chacun des codes de modulation numériques à 14 bits satisfaisant l'exigence selon laquelle le nombre de bits identiques consécutifs dans la partie de jonction du code de modulation numérique à 14 bits précédent déjà sélectionné et du code de modulation numérique à 14 bits à sélectionner, doit avoir l'une des valeurs 2 à 7; et

une étape 4 pour sélectionner en outre un code de modulation numérique à 14 bits parmi les codes de modulation sélectionnés à l'étape 3, de façon que ce code de modulation numérique à 14 bits particulier satisfasse l'exigence selon laquelle la valeur absolue de la DSV (valeur de somme numérique) de bit, pour chaque bit dans le code de modulation, doit être inférieure ou égale à 7.

2. Un procédé de modulation numérique selon la revendication 1, caractérisé en ce que l'étape 3 comprend les procédures suivantes :

on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "01", "001", "0001", "00001" et "000001" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "10";

on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "10", "110", "1110", "11110" et "111110" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "01";

on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "110", "1110", "11110", "111110" "01", "001", "0001", "00001", et "000001" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "100";

on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "001", "0001", "00001", "000001", "10", "110", "1110", "11110", et "111110" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "011";

on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "110", "1110", "11110", "111110", "01", "001", "0001" et "00001" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "1000";

on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "001", "0001", "00001", "000001", "10", "110", "1110" et "11110" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "0111";

on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "110", "1110", "11110", "111110", "01", "001" et "0001" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "0001";

qui a déjà été sélectionné se termine par "10000";

on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "001", "0001", "00001", "000001", "10", "110" et "1110" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "01111";

5 on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "110", "1110", "11110", "111110", "01" et "001" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "100000";

10 on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "001", "0001", "00001", "000001", "10" et "110" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "011111";

15 on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "110", "1110", "11110", "111110", et "01" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "1000000"; et

15 on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "001", "0001", "00001", "000001" et "10" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "0111111".

3. Un procédé de modulation numérique selon la revendication 1, caractérisé en ce que l'étape 4 comprend les procédures suivantes :

20 on sélectionne l'un quelconque des codes de modulation numériques dont les CDS sont égales à 0, -2 et -4, lorsque la DSV à la fin du code de modulation numérique à 14 bits précédent qui a déjà été sélectionné est égale à +2;

25 on sélectionne l'un quelconque des codes de modulation numériques dont les CDS sont égales à +2, 0 et -2, lorsque la DSV à la fin du code de modulation numérique à 14 bits précédent qui a déjà été sélectionné est égale à 0; et

25 on sélectionne l'un quelconque des codes de modulation numériques dont les CDS sont égales à +4, +2 et 0 lorsque la DSV à la fin du code de modulation numérique à 14 bits précédent qui a déjà été sélectionné est égale à -2.

30 4. Un procédé de modulation numérique selon la revendication 1, caractérisé en ce que les codes de modulation numériques qui sont obtenus à l'étape 1 sont les codes indiqués dans les Tableaux 4 et 5 suivants, ou les codes obtenus en remplaçant une partie du Tableau 4 par le Tableau 12 suivant, ou les codes obtenus en remplaçant une partie du Tableau 5 par le Tableau 13 suivant.

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Tableau 4 (CDS ≥ 0)

5	Classe	Données à 8 bits	Codes de modulation commençant par "0"		CDS	Classe	Données à 8 bits	Codes de modulation commençant par "1"		CDS
10		0	01111110000001	0	0		0	10000001111110	0	0
		1	01111100110000	0			1	10000011001111	0	
		2	01111100011000	0			2	10000011100111	0	
		3	01111100001100	0			3	10000011110011	0	
		4	01111100000110	0			4	10000011111001	0	
		5	01111100000011	0			5	10000011111100	0	
		6	01111001110000	0			6	10000110001111	0	
		7	01111001100001	0			7	10000110011110	0	
		8	01111000111000	0			8	10000111000111	0	
		9	01111000110001	0			9	10000111001110	0	
		10	01111000011100	0			10	10000111100011	0	
		11	01111000011001	0			11	10000111100110	0	
		12	01111000001110	0			12	10000111110001	0	
		13	01111000000111	0			13	10000111111000	0	
		14	01110011110000	0			14	10001100001111	0	
		15	01110011110001	0			15	10001100011110	0	
		16	01110011001100	0			16	10001100110011	0	
		17	01110011000110	0			17	100011001111001	0	
		18	01110011000011	0			18	10001100111100	0	
		19	01110001111000	0			19	10001110000111	0	
		20	01110001110001	0			20	10001110001110	0	
		21	01110001100110	0			21	10001110011001	0	
		22	01110001100011	0			22	10001110011100	0	
		23	01110000111000	0			23	10001111000011	0	
		24	01110000111001	0			24	10001111000110	0	
		25	01110000110011	0			25	100011111001100	0	
		26	01110000011110	0			26	10001111100001	0	
		27	01110000001111	0			27	10001111110000	0	
		28	01100111110000	0			28	100011000001111	0	
		29	01100111110001	0			29	100011000011110	0	
		30	01100111001100	0			30	100011000110011	0	
		31	01100111000110	0			31	100011000111001	0	
		32	01100111000011	0			32	100011000111100	0	
		33	01100110011100	0			33	100011001100011	0	
	35	1(A)	34	01100110011001	0	1(B)	34	100011001100110	0	
		35	01100110001110	0			35	100011001110001	0	
		36	01100011000011	0			36	100011001111000	0	
		37	01100011110000	0			37	100011100000111	0	
		38	01100011110001	0			38	100011100001110	0	
		39	01100011100110	0			39	100011100011001	0	
		40	01100011100011	0			40	100011100011100	0	
		41	01100011001110	0			41	100011100110001	0	
		42	01100011000111	0			42	100011100111000	0	
		43	01100001111100	0			43	100011110000011	0	
		44	01100001111001	0			44	100011110000110	0	
		45	01100001110011	0			45	100011110001100	0	
		46	01100001100111	0			46	100011110011000	0	
		47	01100000111110	0			47	100011111000001	0	
		48	01100000011111	0			48	100011111100000	0	
		49	01111111001100	4			49	100000111111110	2	
		50	01111111000110	4			50	10000110011111	2	
		51	01111111000011	4			51	100001110011111	2	
		52	011111110011100	4			52	100001111001111	2	
		53	011111110011001	4			53	10000111110011	2	
		54	011111110001110	4			54	10000111111001	2	
		55	011111110000111	4			55	100001111111100	2	
		56	0111111100111100	4			56	100001110011111	2	
		57	01111111001111001	4			57	1000011100111110	2	
		58	0111111100110011	4			58	1000011100011111	2	
		59	0111111100011110	4			59	1000011100111110	2	
		60	0111111100001111	4			60	1000011111000111	2	
		61	011111001111100	4			61	10000111110001110	2	
		62	0111110011110011	4			62	10000111111000111	2	
		63	0111110011110011	4			63	10000111111001110	2	

Tableau 4 (CDS ≥ 0)

	Classe	Données à 8 bits	Codes de modulation commençant par "0"	CDS	Classe	Données à 8 bits	Codes de modulation commençant par "1"	CDS
5		64	01111001100111	4		64	10001111110001	2
10		65	011110000111110	4		65	10001111111000	2
		66	011110000111111	4		66	100110000111111	2
15		67	01110011111100	4		67	100110001111110	2
		68	011100111111001	4		68	100110011001111	2
		69	011100111100111	4		69	100110011110011	2
		70	011100111001111	4		70	100110011111001	2
		71	011100110011111	4		71	1001110001111100	2
		72	01110001111110	4		72	100111000011111	2
		73	011100001111111	4		73	100111000111110	2
		74	01100111111100	4		74	100111001100111	2
		75	011001111111001	4		75	100111001111001	2
		76	0110011111110011	4		76	100111001111100	2
		77	011001111100111	4		77	100111100011111	2
20		78	011001110011111	4		78	100111100011110	2
		79	011001100111111	4		79	100111100111101	2
		80	011000111111110	4		80	1001111001111100	2
		81	01111111000001	2		81	100111110000111	2
		82	011111110011000	2		82	10011111000110	2
		83	011111110001100	2		83	10011111001100	2
		84	011111110000110	2		84	10011111100001	2
25		85	011111110000011	2		85	10011111110000	2
		86	011111100111000	2		86	100011110011111	4
		87	011111100110001	2		87	100011111001111	4
		88	011111100011100	2		88	100011111100111	4
		89	011111100011001	2		89	100110011111110	4
		90	011111100001110	2		90	100111001411110	4
30		91	011111100000111	2		91	100111100011111	4
		92	0111001111000	2		92	100111100111110	4
		93	01110011110001	2		93	100111110001111	4
		94	0111001100110	2		94	100111110011110	4
		95	0111001100011	2		95	1001111100011	4
		96	0111000111100	2		96	1001111100110	4
35	1(A)	97	011110001111001	2		97	110001111001111	4
		98	011110001100111	2		98	110001111100111	4
		99	011110000111110	2		99	110000001111111	2
		100	011110000011111	2		100	110000011111110	2
40		101	011100111111000	2		101	110000110011111	2
		102	011100111110001	2		102	110000111100111	2
		103	011100111100110	2		103	110000111110011	2
		104	011100111000011	2		104	110000111111001	2
		105	011100110011110	2		105	110000111111100	2
		106	011100110001111	2		106	110001100011111	2
		107	011100011111100	2		107	110001100111110	2
		108	011100011111001	2		108	110001110001111	2
		109	011100011100111	2	2(B)	109	110001110011110	2
45		110	011100011001111	2		110	110001111000111	2
		111	011100001111110	2		111	110001111100110	2
		112	011100001111111	2		112	110001111110001	2
		113	011001111111000	2		113	110001111111100	2
		114	011001111100011	2		114	110011000011111	2
		115	011001111001110	2		115	110011000111110	2
		116	011001111000111	2		116	110011001100111	2
		117	011001110011110	2		117	110011001111001	2
		118	011001110001111	2		118	110011001111100	2
		119	011001100111110	2		119	110011100001111	2
50		120	011001100011111	2		120	110011100011110	2
		121	011000111111100	2		121	110011100111101	2
		122	011000111111001	2		122	110011100111100	2
		123	011000111100111	2		123	110011110000111	2
55		124	011000111001111	2		124	110011110001110	2
		125	011000110011111	2		125	110011110011000	2
		126	011000011111110	2		126	11001111100001	2
		127	011000011111111	2		127	110011111110000	2

Tableau 4 (CDS \geq 0)

Classe	Données à 8 bits	Codes de modulation commençant par "0"	CDS	Classe	Données à 8 bits	Codes de modulation commençant par "1"	CDS
5	128	00111111100000	0	128	11000000011111	0	0
10	129	00111111100001	0	129	110000000111110	0	0
130	001111110011000	0	130	110000001100111	0	0	
131	001111110001100	0	131	110000001110011	0	0	
132	001111100001110	0	132	110000001111001	0	0	
133	001111100000111	0	133	110000001111100	0	0	
134	001111100111000	0	134	110000011000111	0	0	
135	001111100110001	0	135	110000011001110	0	0	
136	001111100011100	0	136	110000011100011	0	0	
137	001111100011001	0	137	1100000111100110	0	0	
138	001111100001110	0	138	1100000111110001	0	0	
139	001111100000111	0	139	1100000111111000	0	0	
140	001111001111000	0	140	110000110000111	0	0	
141	001111001110001	0	141	110000110001110	0	0	
142	001111001100110	0	142	110000110011001	0	0	
20	143	001111001100011	0	2(B)	143	110000110011100	0
144	001111000111100	0	144	110000111000011	0	0	
145	001111000111001	0	145	110000111000110	0	0	
146	001111000110011	0	146	110000111001100	0	0	
147	001111000011110	0	147	110000111100001	0	0	
148	001111000001111	0	148	110000111110000	0	0	
25	149	00110011111000	0	149	11001100000111	0	0
150	001100111110001	0	150	11001100001110	0	0	
151	001100111100110	0	151	11001100011001	0	0	
152	00110011000111	0	152	11001100011100	0	0	
153	00110011001110	0	153	11001100110001	0	0	
154	001100110001111	0	154	11001100111000	0	0	
30	155	00110001111100	0	155	11001110000011	0	0
156	00110001111001	0	156	11001110000110	0	0	
157	001100011100111	0	157	11001110001100	0	0	
158	001100011001111	0	158	11001110011000	0	0	
159	00110000111110	0	159	11001111000001	0	0	
160	001100000111111	0	160	11001111100000	0	0	
35	2(A)	161	00111111100001	2	161	11001100111110	4
162	00111111001100	2	162	11001110011110	4		
163	00111111000110	2	163	11001110001111	4		
164	001111110000111	2	164	11001111001110	4		
165	001111110001100	2	165	11001111000011	4		
166	0011111100011001	2	166	11001111000110	4		
167	001111110001110	2	167	11100001111110	6		
168	001111110000111	2	168	11100011100111	6		
169	00111100111100	2	169	111000111100111	6		
170	001111001111001	2	170	111000111111100	6		
171	001111001100111	2	171	111001100111110	6		
172	00111100011110	2	172	111001110001111	6		
173	001111000011111	2	173	11100111001110	6		
45	174	001110011111100	2	174	11100111100011	6	
175	001110011111001	2	175	11100111100110	6		
176	001110011110011	2	176	111001111111000	6		
177	001110011001111	2	177	111000000111111	2		
178	001110001111110	2	178	111000000111110	2		
179	001110000111111	2	179	111000011001111	2		
180	001100111111100	2	180	111000011110011	2		
181	001100111111001	2	181	111000011111001	2		
182	001100111100111	2	182	111000011111100	2		
183	001100111001111	2	183	111000110001111	2		
184	001100110011111	2	184	111000110011110	2		
185	00110001111110	2	185	111000111000111	2		
186	001100001111111	2	186	111000111100110	2		
187	001111111001110	4	187	111000111110001	2		
188	001111111000111	4	188	111000111111000	2		
189	001111111001110	4	189	111001100001111	2		
190	001111111000111	4	190	111001100011110	2		
55	191	0011111110011110	4	191	11100110011001	2	

Tableau 4 (CDS ≥ 0)

	Classe	Données à 8 bits	Codes de modulation commençant par "0"	CDS	Classe	Données à 8 bits	Codes de modulation commençant par "1"	CDS
5	2(A)	192	00111110001111	6	3(B)	192	11100110011100	2
		193	00111100111110	6		193	11100111000011	2
		194	00111100011111	6		194	11100111000110	2
		195	00111001111110	6		195	11100111001100	2
		196	00111000111111	6		196	11100111100001	2
		197	00110011111110	6		197	11100111100000	2
		198	00011111100000	0		198	11100000011111	0
		199	00011111100001	0		199	11100000011110	0
		200	00011111001100	0		200	111000000110011	0
		201	00011111000110	0		201	111000000111001	0
10	3(A)	202	00011111000011	0		202	111000000111100	0
		203	000111110011100	0		203	111000001100011	0
		204	000111110011001	0		204	111000001100110	0
		205	000111110001110	0		205	111000001110001	0
		206	000111110000111	0		206	111000001111000	0
		207	000111001111100	0		207	111000110000111	0
		208	000111001111001	0		208	111000110001110	0
		209	000111001100111	0		209	111000110011000	0
		210	000111000111110	0		210	11100011100001	0
		211	000111000011111	0		211	11100111100000	0
15	4(A)	212	000110011111100	0		212	11100110000111	0
		213	000110011110001	0		213	11100110000110	0
		214	000110011110011	0		214	11100110001100	0
		215	000110011001111	0		215	111001100110000	0
		216	000110001111110	0		216	11100111000001	0
		217	000110000111111	0		217	111001111000000	0
		218	00011111110001	2	4(B)	218	111100011111100	4
		219	000111111000110	2		219	111100111111000	4
		220	000111111000011	2		220	111100000011111	2
		221	000111110011110	2		221	111100000111110	2
		222	000111110001111	2		222	111100001100111	2
		223	000111110011110	2		223	111100001111001	2
		224	000111110001111	2		224	111100001111000	2
		225	000111001111110	2		225	111100011100011	2
		226	000111000111111	2		226	11110001100110	2
		227	000110011111110	2		227	111100011100011	2
20	5(A)	228	000110001111111	2		228	111100011111000	2
		229	000111111100011	4		229	111100110000111	2
		230	000111111001111	4		230	111100110001110	2
		231	000111110011111	4		231	111100110011000	2
		232	0001111100111111	4		232	111100111100001	2
		233	0001110011111111	4		233	111100111100000	2
		234	00001111111000	0	5(B)	234	111100000001111	0
		235	00001111110001	0		235	11110000001110	0
		236	000011111100110	0		236	11110000011001	0
		237	000011111100011	0		237	11110000011100	0
		238	000011111001110	0		238	11110000110001	0
		239	000011111000111	0		239	11110000111000	0
		240	0000111110011110	0		240	11110001100001	0
		241	0000111100111111	0		241	11110001110000	0
		242	0000111001111110	0		242	11110011000001	0
		243	0000111000111111	0		243	111100111100000	0
45	4(A)	244	00001111111001	2		244	111110000001111	2
		245	00001111110011	2		245	11111000001110	2
		246	000011111001111	2		246	11111000011001	2
		247	0000111110011111	2		247	11111000011100	2
		248	0000111001111111	2		248	111110001110000	2
		249	00001110011111111	2		249	111110011100000	2
		250	00000111111100	0	5(B)	250	111110000000011	0
		251	00000111111001	0		251	111110000000110	0
		252	000001111110011	0		252	1111100000001100	0
		253	0000011111100111	0		253	111110000110000	0
		254	0000011111001111	0		254	111110001100000	0
55	5(A)	255	0000011100111111	0		255	111110011000000	0

Tableau 5 (CDS ≤ 0)

Classe	Données à 8 bits	Codes de modulation commençant par "0"	CDS	Classe	Données à 8 bits	Codes de modulation commençant par "1"	CDS
5	0	01111110000001	0		0	10000001111110	0
10	1	01111100110000	0		1	10000011001111	0
15	2	01111100011000	0		2	10000011100111	0
20	3	01111100001100	0		3	10000011110011	0
25	4	01111100000110	0		4	10000011111001	0
30	5	01111100000011	0		5	10000011111100	0
35	6	01111001110000	0		6	100000110011110	0
40	7	01111001010001	0		7	100000110011110	0
45	8	01111000111000	0		8	100000111000111	0
50	9	01111000011001	0		9	100000111100110	0
55	10	01111000001100	0		10	100000111110011	0
60	11	011110000001101	0		11	100000111111001	0
65	12	011110000000110	0		12	1000001111111001	0
70	13	0111100000000111	0		13	1000011111111000	0
75	14	01110011110000	0		14	100011000011111	0
80	15	01110011100001	0		15	100011000111110	0
85	16	01110011001100	0		16	100011001100111	0
90	17	01110011000110	0		17	100011001111001	0
95	18	01110011000011	0		18	100011001111100	0
100	19	01110001111000	0		19	100011100001111	0
105	20	01110001110001	0		20	100011100011110	0
110	21	01110001110010	0		21	10001110011001	0
115	22	01110001100011	0		22	100011100111100	0
120	23	01110000111100	0		23	100011110000111	0
125	24	01110000111001	0		24	10001111000110	0
130	25	01110000110011	0		25	10001111001100	0
135	26	01110000011110	0		26	10001111100001	0
140	27	01110000001111	0		27	10001111110000	0
145	28	01100111110000	0		28	10011000001111	0
150	29	01100111100001	0		29	10011000011110	0
155	30	01100111001100	0		30	10011000111001	0
160	31	011001110000110	0		31	10011000111100	0
165	32	011001110000011	0		32	100110001111100	0
170	33	01100110011100	0	35	100110011000110	0	
175	34	01100110011001	0	34	10011001100110	0	
180	35	01100110001110	0	35	10011001110001	0	
185	36	01100110000111	0	36	10011001111000	0	
190	37	01100011111000	0	37	100111000001110	0	
195	38	01100011110001	0	38	100111000011001	0	
200	39	01100011100110	0	39	100111000011100	0	
205	40	01100011100011	0	40	100111000011100	0	
210	41	01100011001110	0	41	100111000110001	0	
215	42	01100011000111	0	42	100111001110000	0	
220	43	011000110000110	0	43	100111000001110	0	
225	44	011000110000011	0	44	100111000001110	0	
230	45	011000011100011	0	45	100111100001100	0	
235	46	011000011000111	0	46	100111100011000	0	
240	47	01100000111100	0	47	10011111000001	0	
245	48	01100000011111	0	48	10011111100000	0	
250	49	011111000000001	-2	49	10000000110011	-4	
255	50	01111001100000	-2	50	10000000111001	-4	
260	51	01111000110000	-2	51	10000000111100	-4	
265	52	01111000011000	-2	52	100000001100110	-4	
270	53	01111000001100	-2	53	100000001110001	-4	
275	54	01111000000110	-2	54	100000001111000	-4	
280	55	01111000000011	-2	55	100000001100001	-4	
285	56	01110011100000	-2	56	100000001100011	-4	
290	57	01110011000001	-2	57	1000000011000110	-4	
295	58	01110001110000	-2	58	1000000011001100	-4	
300	59	01110001100001	-2	59	1000000011100001	-4	
305	60	01110000111000	-2	60	1000000011110000	-4	
310	61	01110000110001	-2	61	100000110000011	-4	
315	62	01110000011100	-2	62	1000001100000110	-4	
320	63	011100000011001	-2	63	100000110001100	-4	

Tableau 5 (CDS ≤ 0)

Classe	Données à 8 bits	Codes de modulation commençant par "0"	CDS	Classe	Données à 8 bits	Codes de modulation commençant par "1"	CDS
10	64	01110000001110	-2	15	64	10000110011000	-6
	65	01110000001111	-2		65	10000111000001	-6
	66	01100111100000	-2		66	10000111100000	-6
	67	01100111100001	-2		67	10001100000011	-6
	68	01100110011000	-2		68	10001100000110	-6
	69	01100110011001	-2		69	10001100001100	-6
	70	01100110000110	-2		70	10001100011000	-6
	71	01100110000011	-2		71	10001100110000	-6
	72	01100011110000	-2		72	10001110000001	-6
	73	01100011100001	-2		73	10001111000000	-6
	74	01100011001100	-2		74	10011000000011	-6
	75	01100011000110	-2		75	10011000000110	-6
	76	01100011000011	-2		76	10011000001100	-6
	77	01100001111000	-2		77	10011000011000	-6
	78	01100001110001	-2		78	10011000110000	-6
	79	01100001100110	-2		79	10011001100000	-6
	80	01100000110001	-2		80	10011100000001	-6
	81	01100000111100	-2		81	10000000111110	-2
	82	011000001111001	-2		82	10000001100111	-2
	83	01100000110011	-2		83	10000001110011	-2
	84	01100000011110	-2		84	100000011111001	-2
	85	01100000001111	-2		85	100000001111100	-2
	86	01110000110000	-4		86	10000011000111	-2
	87	01110000011000	-4		87	10000011001110	-2
	88	01110000001100	-4		88	100000011100011	-2
	89	01100110000001	-4		89	100000011100110	-2
	90	01100011000001	-4		90	100000111110001	-2
	91	01100001110000	-4		91	100000011111100	-2
	92	01100001100001	-4		92	10000110000111	-2
	93	01100000111000	-4		93	10000110001110	-2
	94	01100000110001	-4		94	10000110011100	-2
	95	01100000011100	-4		95	10000011100001	-2
	96	01100000011001	-4		96	100000111000011	-2
	97	00111000011000	-4	35	97	10000111000110	-2
	98	00111000001100	-4		98	10000111001100	-2
	99	00111110000000	-2		99	10000111100001	-2
	100	00111110000001	-2		100	10000111110000	-2
	101	00111100110000	-2		101	10001100000111	-2
	102	00111100011000	-2		102	10001100001110	-2
	103	00111100001100	-2		103	10001100011001	-2
	104	00111100000110	-2		104	10001100011100	-2
	105	00111100000011	-2		105	10001100110001	-2
	106	00111000111000	-2		106	10001100111000	-2
	107	00110011000001	-2		107	10001110000011	-2
	108	00111000111000	-2		108	10001110000110	-2
	109	00111000110001	-2		109	10001110001100	-2
	110	00111000011100	-2		110	10001110011000	-2
	111	00111000011001	-2	45	111	10001111000001	-2
	112	00111000001110	-2		112	10001111100000	-2
	113	00111000001111	-2		113	10011000000111	-2
	114	00110011110000	-2		114	10011000001110	-2
	115	00110011110001	-2		115	10011000011001	-2
	116	00110011001100	-2		116	10011000011100	-2
	117	00110011000110	-2		117	10011000110001	-2
	118	00110011000011	-2		118	10011000111000	-2
	119	00110001111000	-2		119	10011000110001	-2
	120	00110001110001	-2		120	10011001110000	-2
	121	001100011000110	-2		121	10011100000011	-2
	122	001100011000011	-2		122	10011100000110	-2
	123	00110000111100	-2		123	10011100001100	-2
	124	00110000111001	-2		124		10011100011000	-2
	125	00110000110011	-2		125		10011100110000	-2
	126	00110000011110	-2		126		10011110000001	-2
	127	00110000011111	-2		127		10011111000000	-2

Tableau 5 (CDS ≤ 0)

	Classe	Données à 8 bits	Codes de modulation commençant par "0"	CDS	Classe	Données à 8 bits	Codes de modulation commençant par "1"	CDS
5		128	00111111000000	0	128	11000000011111	0	0
		129	00111111000001	0	129	11000000111110	0	0
		130	00111110011000	0	130	11000001100111	0	0
		131	00111110001100	0	131	11000001110011	0	0
		132	00111110000110	0	132	11000001111001	0	0
		133	00111110000011	0	133	11000001111100	0	0
		134	00111100111000	0	134	11000001100011	0	0
		135	00111100110001	0	135	11000001100110	0	0
		136	00111100011100	0	136	11000001110001	0	0
		137	00111100011001	0	137	110000011100110	0	0
		138	00111100001110	0	138	1100000111110001	0	0
		139	00111100000111	0	139	1100000111111000	0	0
		140	00111001111000	0	140	11000110000111	0	0
		141	00111001110001	0	141	11000110001110	0	0
		142	00111001100110	0	142	11000110011001	0	0
10	2(C)	143	00111001100011	0	143	110001100011100	0	0
		144	00111000111100	0	144	110001110000111	0	0
		145	00111000111001	0	145	11000111000110	0	0
		146	00111000110011	0	146	110001110001100	0	0
		147	00111000011110	0	147	11000111100001	0	0
		148	00111000001111	0	148	11000111110000	0	0
		149	00110011111000	0	149	11001100000111	0	0
		150	00110011110001	0	150	11001100001110	0	0
		151	0011001100110	0	151	11001100011001	0	0
		152	00110011100011	0	152	11001100011100	0	0
		153	00110011001110	0	153	11001100110001	0	0
		154	00110011000111	0	154	11001100111000	0	0
		155	00110001111100	0	155	11001110000011	0	0
		156	00110001111001	0	156	11001110000110	0	0
		157	00110001110011	0	157	11001110001100	0	0
		158	00110001100111	0	158	11001110011000	0	0
20		159	00110000111110	0	159	11001111000001	0	0
		160	00110000011111	0	160	11001111100000	0	0
		161	00110001100001	-4	161	11000000011110	-2	
		162	00110001100001	-4	162	11000000110011	-2	
		163	00110000111000	-4	163	11000000111100	-2	
		164	00110000110001	-4	164	110000001100011	-2	
		165	00110000011100	-4	165	110000001100110	-2	
		166	00110000011001	-4	166	110000001100110	-2	
		167	00011100000001	-4	167	110000001110001	-2	
		168	000111000011000	-4	168	110000001111000	-2	
		169	000111000011000	-4	169	110000011000011	-2	
		170	00011100000011	-4	170	110000011000110	-2	
		171	00011000110001	-4	171	110000011001100	-2	
		172	00011000111000	-4	172	110000011100001	-2	
		173	00011000110001	-4	173	110000011110000	-2	
30	3(C)	174	00011000011100	-4	174	1100000110000011	-2	
		175	000110000011001	-4	175	1100000110000110	-2	
		176	000110000001111	-4	176	1100000110001100	-2	
		177	00011111000000	-2	177	1100000110011000	-2	
		178	000111110000001	-2	178	1100000111000001	-2	
		179	000111100011000	-2	179	1100000111100000	-2	
		180	000111100001100	-2	180	11001100000011	-2	
		181	000111100000110	-2	181	110011000001100	-2	
		182	000111100000011	-2	182	1100110000011000	-2	
		183	000111000111000	-2	183	110011000011000	-2	
		184	000111000110001	-2	184	11001110000001	-2	
		185	000111000011100	-2	185	110011100000001	-2	
		186	000111000011001	-2	186	110011110000000	-2	
		187	000111000001110	-2	187	11000000011001	-4	
		188	0001110000011011	-2	188	110000000111000	-4	
55		189	00011001111000	-2	189	110000000110001	-4	
		190	00011001110001	-2	190	110000000111000	-4	
		191	00011001100110	-2	191	1100000001100001	-4	

Tableau 5 (CDS < 0)

	Classe	Données à 8 bits	Codes de modulation commençant par "0"	CDS	Classe	Données à 8 bits	Codes de modulation commençant par "1"	CDS
5	3(C)	192	00011001100011	-2	2(D)	192	110000001110000	-4
		193	00011000111100	-2		193	11000011000001	-4
		194	00011000111001	-2		194	11000011100000	-4
		195	00011000110011	-2		195	11000110000001	-4
		196	00011000011110	-2		196	11000111000000	-4
		197	00011000001111	-2		197	11001100000001	-4
		198	00011111110000	0		198	11100000001111	0
		199	00011111100001	0		199	111000000011110	0
		200	00011111001100	0		200	111000000110011	0
		201	00011111000110	0		201	111000000111001	0
		202	00011111000111	0		202	111000000111100	0
		203	00011110011000	0		203	111000001100011	0
		204	00011110011001	0		204	111000001100110	0
		205	00011110001110	0		205	111000001110001	0
		206	00011110000111	0		206	111000001111000	0
		207	000111000111100	0		207	111000110000111	0
		208	00011100111001	0		208	111000110001110	0
		209	00011100110011	0		209	11100011001100	0
		210	00011100011110	0		210	11100011100001	0
		211	00011100001111	0		211	11100011110000	0
		212	00011001111100	0		212	111001100000111	0
		213	000110011111001	0		213	111001100001110	0
		214	000110001100111	0	3(D)	214	11100110001100	0
		215	000110001100111	0		215	11100110011000	0
		216	00011000111110	0		216	11100111000001	0
		217	00011000011111	0		217	11100111100000	0
		218	00001110000011	-2		218	11100000001110	-2
30	4(C)	219	00001100000111	-2		219	11100000011001	-2
		220	00001111110000	-2		220	11100000011100	-2
		221	00001111100001	-2		221	11100000110001	-2
		222	00001111001100	-2		222	11100000111000	-2
		223	00001111000110	-2		223	11100001100001	-2
		224	00001111000011	-2		224	11100001110000	-2
		225	00001110011100	-2		225	11100011000001	-2
		226	00001110011001	-2		226	11100011100000	-2
		227	00001110001110	-2		227	11100110000001	-2
		228	00001110000111	-2		228	11100111000000	-2
		229	00001100111100	-2		229	11100000001100	-4
		230	000011001111001	-2		230	11100000011000	-4
		231	00001100110011	-2		231	111000000110000	-4
		232	00001100011110	-2		232	11100001100000	-4
		233	00001100001111	-2		233	11100011000000	-4
		234	00001111110000	0		234	11110000000111	0
		235	00001111110001	0		235	11110000001110	0
		236	000011111100110	0		236	11110000011001	0
		237	000011111100011	0		237	11110000011100	0
45	4(D)	238	0000111110001110	0		238	11110000110001	0
		239	0000111100001111	0		239	11110000111000	0
		240	0000111100111110	0		240	11110001100001	0
		241	0000111100011111	0		241	11110001110000	0
		242	0000110001111110	0		242	11110011000001	0
		243	0000110001111111	0		243	11110011100000	0
		244	00000111111000	-2		244	11110000000110	-2
		245	00000111111001	-2		245	11110000001100	-2
		246	000001111100110	-2		246	111100000011000	-2
		247	000001111100011	-2		247	11110000110000	-2
55	5(C)	248	000001110001111	-2		248	111100001100000	-2
		249	00000110001111	-2		249	11110011000000	-2
		250	00000111111000	0		250	11111000000011	0
		251	00000111111001	0		251	11111000000110	0
		252	00000111110011	0		252	11111000001100	0
		253	0000011111001111	0		253	11111000011000	0
		254	000001110011111	0		254	11111000110000	0
		255	0000011001111111	0		255	11111001100000	0
		5(D)				5(D)		

TABLEAU 12

5	Données à 8 bits	Codes de modulation	CDS
10	248	11111000110001	2
15	249	11111000111000	2
20	250	11111001100001	2
25	251	11111001110000	2

TABLEAU 13

25	Données à 8 bits	Codes de modulation	CDS
30	248	00000111001110	-2
35	249	00000111000111	-2
40	250	00000110011110	-2
45	251	00000110001111	-2

5. Un procédé de modulation numérique pour convertir des données numériques à 8 bits en codes de modulation numériques à 14 bits, ce procédé de modulation numérique comprenant :

40 une étape 1 pour sélectionner jusqu'à quatre codes de modulation numériques à 14 bits pour chaque donnée numérique à 8 bits, le code de modulation numérique à 14 bits étant sélectionné par les procédures suivantes :

45 (a) on sélectionne parmi les 2^{14} codes numériques à 14 bits un code numérique dans lequel les nombres de bits identiques consécutifs sont égaux à 6 ou moins dans les 7 premiers bits, à 2 à 7 du second bit au 13-ième bit, et à 5 ou moins dans les 6 derniers bits, et on répète cette procédure de sélection,

50 (b) on sélectionne parmi les codes numériques à 14 bits sélectionnés à la procédure (a) un code numérique dont le premier bit est "0", et dont la CDS a une valeur absolue inférieure ou égale à 6, et on répète cette procédure de sélection,

55 (c) on sélectionne parmi les codes numériques à 14 bits sélectionnés à la procédure (a) un code numérique dont le premier bit est "1", et dont la CDS a une valeur absolue inférieure ou égale à 4, et on répète cette procédure de sélection,

 (d) on sélectionne parmi les codes numériques à 14 bits sélectionnés à la procédure (b) un code numérique dont la valeur de CDS est égale à 0, et on combine le code numérique à 14 bits sélectionné avec son code inversé, pour former un groupe avec les 2 codes numériques, et on répète cette procédure de sélection,

 (e) on sélectionne parmi les codes numériques à 14 bits sélectionnés à la procédure (b) un code numérique dont la valeur de CDS est égale à +2, +4 ou +6, on sélectionne parmi les codes numériques à 14 bits sélectionnés à la procédure (c) un code numérique dont la valeur de CDS est égale à +2 ou

+4, et on combine les deux codes numériques à 14 bits sélectionnés avec leurs codes inversés, pour former un groupe avec les 4 codes numériques, et on répète cette procédure de sélection, et
 (f) on sélectionne pour les codes de modulation numériques à 14 bits 256 groupes parmi les groupes formés dans les procédures ci-dessus;

5 une étape 2 pour sélectionner un groupe de codes de modulation numériques à 14 bits parmi les 256 groupes de codes de modulation numériques à 14 bits, le groupe sélectionné correspondant à la donnée numérique à 8 bits qui est appliquée en entrée;

10 une étape 3 pour sélectionner en outre un ou plusieurs codes de modulation numériques à 14 bits dans le groupe sélectionné à l'étape 2, chacun des codes de modulation numériques à 14 bits satisfaisant l'exigence selon laquelle le nombre de bits identiques consécutifs dans la partie de jonction entre le code de modulation numérique à 14 bits précédent déjà sélectionné, et le code de modulation numérique à 14 bits à sélectionner, doit avoir l'une des valeurs 2 à 7; et

15 une étape 4 pour sélectionner en outre un code de modulation numérique à 14 bits parmi les codes de modulation sélectionnés à l'étape 3, de façon que ce code de modulation à 14 bits particulier satisfasse l'exigence selon laquelle la valeur absolue de la DSV de bit pour chaque bit dans le code de modulation doit être inférieure ou égale à 8.

6. Un procédé de modulation numérique selon la revendication 5, dans lequel l'étape 3 comprend les procédures suivantes :

20 on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "01", "001", "0001", "00001", "000001" et "0000001" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "10".

25 on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "10", "110", "1110", "11110", "111110" et "1111110" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "01";

30 on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "110", "1110", "11110", "111110", "01", "001", "0001", "00001" et "000001" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "100";

35 on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "001", "0001", "00001", "000001", "0000001", "10", "110", "1110", "11110" et "111110" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "011";

40 on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "110", "1110", "11110", "111110", "1111110", "01", "001", "0001" et "00001" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "1000";

45 on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "001", "0001", "00001", "000001", "0000001", "10", "110", "1110" et "11110" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "0111"; on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "110", "1110", "11110", "111110", "01", "001" et "0001" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "10000";

50 on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "001", "0001", "00001", "000001", "0000001", "10", "110" et "1110" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "01111";

55 on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "110", "1110", "11110", "111110", "01" et "001" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "100000"; et

60 on sélectionne l'un quelconque des codes de modulation numériques dont les premiers bits sont "001", "0001", "00001", "000001", "0000001", "10" et "110" lorsque le code de modulation numérique précédent qui a déjà été sélectionné se termine par "011111".

7. Un procédé de modulation numérique selon la revendication 5, dans lequel l'étape 4 comprend les procédures suivantes :

65 on sélectionne l'un quelconque des codes de modulation numériques dont les CDS sont égales à 0, -2, -4 et -6 lorsque la DSV à la fin du code de modulation numérique à 14 bits précédent qui a déjà été sélectionné est égale à +4 ou +2;

70 on sélectionne l'un quelconque des codes de modulation numériques dont les CDS sont égales à +4, +2, 0, -2 et -4 lorsque la DSV à la fin du code de modulation numérique à 14 bits précédent qui a déjà été sélectionné est égale à 0; et

on sélectionne l'un quelconque des codes de modulation numériques dont les CDS sont égales à +6, +4, +2 et 0 lorsque la DSV à la fin du code de modulation numérique à 14 bits précédent qui a déjà été sélectionné est égale à -2 ou -4.

5 8. Un procédé de modulation numérique selon la revendication 5, dans lequel les codes de modulation numériques sont les codes qui sont indiqués dans les Tableaux 17 et 18 suivants.

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Tableau 17 (CDS ≥ 0)

5	Classe	Données à 8 bits	Codes de modulation commençant par "0"	CDS	Classe	Données à 8 bits	Codes de modulation commençant par "1"	CDS
10		0	0111110000001	0		0	10000001111110	0
	1	0111110011000	0		1	10000011001111	0	
	2	0111110001100	0		2	10000011100111	0	
	3	01111100001100	0		3	10000011110011	0	
	4	01111100000110	0		4	10000011111001	0	
	5	01111100000011	0		5	10000011111100	0	
	6	01111100110000	0		6	10000110001111	0	
	7	01111001100001	0		7	10000110011110	0	
15		8	01111000111000	0		8	10000111000111	0
	9	01111000110001	0		9	10000111001110	0	
	10	01111000011000	0		10	10000111100011	0	
	11	01111000001100	0		11	10000111100110	0	
	12	01111000000110	0		12	10000111110001	0	
	13	01111000000011	0		13	10000111111000	0	
	14	01110011100000	0		14	10001100001111	0	
20		15	01110011100001	0		15	10001100001110	0
	16	01110011001100	0		16	10001100110011	0	
	17	01110011000110	0		17	10001100110001	0	
	18	01110011000011	0		18	10001100111100	0	
	19	01110001111000	0		19	10001110000111	0	
	20	01110001110001	0		20	10001110001110	0	
	21	01110001100110	0		21	10001110011001	0	
	22	01110001100011	0		22	10001110011100	0	
25		23	01110000111000	0		23	10001111000011	0
	24	01110000110001	0		24	10001111000110	0	
	25	01110000110011	0	1 (B)	25	10001111001100	0	
	26	01110000011100	0		26	10001111100001	0	
	27	01110000011110	0		27	10001111110000	0	
	28	01100111100000	0		28	10011000001111	0	
	29	01100111100001	0		29	10011000001110	0	
30		30	01100111001100	0		30	10011000110011	0
	31	01100111000110	0		31	10011000111001	0	
	32	01100111000011	0		32	10011000111100	0	
	33	01100110011100	0		33	10011001100011	0	
	34	01100110011001	0		34	10011001100110	0	
	35	01100110001110	0		35	10011001110001	0	
	36	01100110000111	0		36	10011001111000	0	
35		37	01100011110000	0		37	10011100000111	0
	38	01100011110001	0		38	10011100001110	0	
	39	01100011100110	0		39	10011100001100	0	
	40	01100011100011	0		40	10011100011100	0	
	41	01100011001110	0		41	10011100110001	0	
	42	01100011000111	0		42	10011100111000	0	
	43	01100001111000	0		43	10011110000011	0	
40		44	01100001111001	0		44	10011110000110	0
	45	01100001110011	0		45	10011110001100	0	
	46	01100001100111	0		46	10011110011000	0	
	47	01100000111110	0		47	10011111000001	0	
	48	01100000111111	0		48	10011111100000	0	
	49	01111111000001	2		49	10000011111110	2	
	50	01111111000110	2		50	10000110011111	2	
45		51	01111110001100	2		51	10000111001111	2
	52	01111110000110	2		52	10000111100111	2	
	53	01111110000011	2		53	10000111110011	2	
	54	01111100011100	2		54	10000111111001	2	
	55	01111100011001	2		55	10000111111100	2	
	56	01111100001100	2		56	10000110001111	2	
	57	01111100000101	2		57	10001100111110	2	
	58	01111100000110	2		58	10001110001111	2	
50		59	01111100000111	2		59	10001110011110	2
	60	01111001111000	2		60	10001111000011	2	
	61	01111001110001	2		61	10001111001110	2	
	62	01111001100110	2		62	10001111100011	2	
	63	01111001100011	2		63	10001111100110	2	
	64	01111000111100	2		64	10001111110001	2	
	65	01111000111001	2		65	10001111111000	2	
55		66	01111000110011	2		66	10011000011111	2

Tableau 17 (CDS ≥ 0)

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Classe	Données à 8 bits	Codes de modulation commençant par "0"	CDS	Classe	Données à 8 bits	Codes de modulation commençant par "1"	CDS
10	67	0111000011110	2		67	1001100011110	2
	68	0111000000111	2		68	1001100110011	2
	69	0111001111100	2		69	1001100111001	2
	70	01110011110001	2		70	10011001111001	2
	71	01110011100110	2		71	1001100111100	2
	72	01110011100011	2		72	1001100001111	2
	73	0111001100110	2		73	10011100011110	2
15	74	0111001100011	2		74	10011100110011	2
	75	01110001111100	2		75	10011100111001	2
	76	01110001111001	2	1 (8)	76	10011100111100	2
	77	01110001110011	2		77	10011110000111	2
	78	01110001100111	2		78	10011110001110	2
	79	0111000011110	2		79	10011110011001	2
20	80	01110000111111	2		80	10011110011100	2
	81	0110011111100	2		81	10011111000011	2
	82	01100111110001	2		82	10011111000110	2
	83	01100111100110	2		83	10011111001100	2
	84	01100111100011	2		84	10011111100001	2
	85	0110011100110	2		85	10011111100000	2
	86	01100111000111	2		86	10011111100011	4
25	87	01100110011110	2		87	11000011111110	4
	88	01100110001111	2		88	11000110011111	4
	89	01100011111100	2		89	11000111001111	4
	90	01100011111001	2		90	11000111100111	4
	91	01100011110011	2		91	11000111110011	4
	92	01100011001111	2		92	11000111111001	4
	93	01100011001111	2		93	11000111111100	4
	94	01100001111110	2		94	11001100011111	4
30	95	01111111001100	4		95	11001100111110	4
	96	01111111000110	4		96	11001110011111	4
	97	01111111000011	4		97	11001110011110	4
	98	01111110011100	4		98	11001111000111	4
	99	01111110011001	4		99	110011111001110	4
35	100	01111110001110	4		100	11001111100011	4
	101	01111110000111	4		101	11000001111110	2
	102	011111001111100	4		102	110000011001111	2
	103	011111001111001	4		103	110000111100111	2
	104	011111001100111	4		104	110000111110011	2
	105	01111100011110	4		105	1100000111111001	2
40	106	01111100001111	4	2 (8)	106	110000011111100	2
	107	01111001111100	4		107	110000110001111	2
	108	01111001111001	4		108	11000110011110	2
	109	01111001110011	4		109	11000111000111	2
	110	01111001100111	4		110	11000111001110	2
	111	01111000111110	4		111	110000111100011	2
	112	01111000011111	4		112	110000111100110	2
	113	01110011111100	4		113	110001111110001	2
	114	01110011111001	4		114	110001111111000	2
	115	01110011110011	4		115	110001100001111	2
	116	01110011100111	4		116	11001100011110	2
45	117	01110011001111	4		117	110011001100111	2
	118	01110001111110	4		118	11001100111001	2
	119	01110011111100	4		119	11001100111100	2
	120	01110011111001	4		120	11001110000111	2
	121	01110011110011	4		121	11001110001110	2
	122	01110011100111	4		122	11001110011001	2
	123	01110011001111	4		123	11001110011100	2
	124	01110011001111	4		124	11001111000011	2
50	125	01110001111110	4		125	11001111000110	2
	126	01111110001111	6		126	11001111001100	2
	127	01111110001111	6		127	11001111000001	2
	128	01111100011111	6		128	11001111100000	2
55	129	00111111100000	0		129	11000000011111	0
	130	001111111000001	0		130	11000000111110	0
	131	00111110011000	0		131	11000001100111	0
	132	00111110001100	0		132	11000001110011	0
	133	00111110000110	0		133	11000001111001	0

Tableau 17 (CDS ≥ 0)

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Classe	Données à 8 bits	Codes de modulation commençant par "0"	CDS	Classe	Données à 8 bits	Codes de modulation commençant par "1"	CDS
10	134	00111110000011	0		134	11000001111100	0
	135	00111100111000	0		135	11000011000111	0
	136	00111100110001	0		136	11000011001110	0
	137	00111100011100	0		137	11000011100011	0
	138	00111100011001	0		138	110000111000110	0
	139	00111100001110	0		139	11000011110001	0
	140	00111100000111	0		140	11000011111000	0
15	141	001110001111000	0		141	11000110001111	0
	142	001110001110001	0		142	11000110001110	0
	143	001110001100110	0		143	11000110011001	0
	144	001110001100011	0		144	110001100111100	0
	145	00111000111100	0		145	11000111000011	0
	146	001110001100110	0	2 (8)	146	11000111000110	0
	147	001110001100111	0		147	11000111001100	0
	148	00111000011110	0		148	11000111100001	0
	149	00111000011111	0		149	11000111110000	0
20	150	00110011111000	0		150	11001100001111	0
	151	001100111110001	0		151	11001100001110	0
	152	00110011100110	0		152	11001100011001	0
	153	00110011100011	0		153	11001100011100	0
	154	00110011001110	0		154	110011001110001	0
	155	00110011000111	0		155	110011001111000	0
	156	00110001111100	0		156	11001110000011	0
25	157	00110001110001	0		157	11001110000110	0
	158	001100011100011	0		158	11001110001100	0
	159	00110001100111	0		159	11001110011000	0
	160	00110000111110	0		160	11001111000001	0
	161	001100001111111	0		161	11001111100000	0
	162	00111111100001	2		162	11001111100110	4
30	163	00111111001100	2		163	11001111110001	4
	164	00111111000110	2		164	110011111111000	4
	165	001111110000011	2		165	11100001111110	4
	166	00111110011100	2		166	11100011001111	4
	167	00111110011001	2		167	11100011100111	4
	168	00111110001110	2		168	11100011110011	4
	169	00111110001111	2		169	111000111111001	4
35	170	00111100111100	2		170	111000111111100	4
	171	00111100111001	2		171	11100110011111	4
	172	00111100110011	2		172	11100110011110	4
	173	00111100011110	2		173	11100111000111	4
	174	00111100011111	2		174	11100111001110	4
	175	001111001111100	2		175	11100111100011	4
	176	001111001111001	2		176	11100111100110	4
	177	001111001110011	2		177	11100111110001	4
40	178	001111000110011	2		178	11100111111100	4
	179	00111100011110	2		179	11100000011111	2
	180	001111000011111	2		180	11100000111110	2
	181	00110011111100	2	3 (8)	181	111000011000111	2
	182	001100111111001	2		182	11100001110011	2
	183	00110011110011	2		183	111000011111001	2
	184	00110011100111	2		184	111000011111100	2
	185	001100110011110	2		185	111000011000111	2
45	186	0011001100111110	2		186	11100011001110	2
	187	00111111100110	4		187	111000111000111	2
	188	00111111100011	4		188	111000111100110	2
	189	00111111001110	4		189	111000111110001	2
	190	0011111000111	4		190	111000111111000	2
50	191	00111110011110	4		191	111000110000111	2
	192	00111110001111	4		192	111000110001110	2
	193	001111000111110	4		193	111000110011001	2
	194	001111000111111	4		194	111000110011100	2
	195	00111001111110	4		195	111000111000011	2
	196	00110011111110	4		196	111000111000110	2
	197	00111111100111	6		197	111000111001100	2
	198	00111111001111	6		198	111000111100001	2
	199	00111110011111	6		199	111001111100000	2

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Tableau 17 (CDS ≥ 0)

Tableau 18 (CDS ≤ 0)

5	Classe	Données à 8 bits	Codes de modulation commençant par "0"	CDS	Classe	Données à 8 bits	Codes de modulation commençant par "1"	CDS
10		0	01111110000001	0		0	1000000011111110	0
		1	01111100110000	0		1	10000011001111	0
		2	01111100011000	0		2	10000011100111	0
		3	01111100001100	0		3	10000011110011	0
		4	01111100000110	0		4	10000011111001	0
		5	01111100000011	0		5	10000011111100	0
		6	01111001110000	0		6	10000110001111	0
		7	01111001100001	0		7	100001100111110	0
		8	01111000111000	0		8	10000111000111	0
		9	01111000110001	0		9	10000111001110	0
		10	01111000011100	0		10	10000111100011	0
		11	01111000011001	0		11	10000111110010	0
		12	01111000001110	0		12	10000111111001	0
		13	01111000000111	0		13	10000111111100	0
		14	01110011110000	0		14	10001100001111	0
		15	01110011100001	0		15	10001100011110	0
		16	01110011001100	0		16	10001100110011	0
		17	01110011000110	0		17	100011001111001	0
		18	01110011000011	0		18	100011001111100	0
		19	01110001111000	0		19	10001110000111	0
		20	01110001110001	0		20	10001110001110	0
		21	01110001100110	0		21	10001110011001	0
		22	01110001100001	0		22	100011100111100	0
		23	01110000111100	0		23	10001111000011	0
		24	01110000111001	0		24	10001111000110	0
		25	01110000110011	0		25	10001111001100	0
	1 (C)	26	01110000011110	0	1 (0)	26	10001111100001	0
		27	01110000011111	0		27	10001111110000	0
		28	01100111110000	0		28	10011000001111	0
		29	01100111100001	0		29	10011000011110	0
		30	01100111001100	0		30	10011000110011	0
		31	01100111000110	0		31	10011000111001	0
		32	01100110000111	0		32	10011000111100	0
		33	01100110011100	0		33	10011001100011	0
		34	01100110011001	0		34	10011001100110	0
		35	01100110001110	0		35	10011001110001	0
		36	01100110000111	0		36	10011001111000	0
		37	01100011110000	0		37	10011100000111	0
		38	01100011110001	0		38	10011100001110	0
		39	01100011100110	0		39	10011100011001	0
		40	01100011000011	0		40	10011100011100	0
		41	01100011001110	0		41	10011100110001	0
		42	01100011000111	0		42	10011100111000	0
		43	01100001111100	0		43	10011110000011	0
		44	01100001111001	0		44	10011110000110	0
		45	01100001110001	0		45	10011110001100	0
		46	01100001100011	0		46	10011110011000	0
		47	01100000111110	0		47	10011111000001	0
		48	01100000111111	0		48	10011111000000	0
		49	01111100000001	-2		49	10000000111110	-2
		50	01111000110000	-2		50	10000001100111	-2
		51	01111000110000	-2		51	10000001110001	-2
		52	01111000011000	-2		52	100000001111001	-2
		53	01111000001100	-2		53	100000001111100	-2
		54	01111000000110	-2		54	100000011000111	-2
		55	01111000000011	-2		55	100000011100110	-2
		56	0111100011100000	-2		56	100000011100011	-2
		57	0111100011000001	-2		57	1000000111000110	-2
		58	0111100011000000	-2		58	1000000111100001	-2
		59	0111100011000001	-2		59	1000000111111000	-2
		60	0111100001110000	-2		60	1000001100001111	-2
		61	0111100000110001	-2		61	1000001100011100	-2
		62	0111100000011000	-2		62	1000001100110001	-2
		63	011100000110001	-2		63	1000011001111000	-2
		64	0111000000110000	-2		64	1000011100000111	-2
		65	0111000000011001	-2		65	1000011100001100	-2
		66	0110011110000000	-2		66	1000011100111000	-2

Tableau 18 ($CDS \leq 0$)

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Classe	Données à 8 bits	Codes de modulation commençant par "0"	CDS	Classe	Données à 8 bits	Codes de modulation commençant par "1"	CDS
1 (C)	67	01100111000001	-2	1 (D)	67	10000111100001	-2
	68	01100110011000	-2		68	10000111110000	-2
	69	011001100001100	-2		69	10001100000111	-2
	70	01100110000110	-2		70	100011000001110	-2
	71	01100110000011	-2		71	10001100011001	-2
	72	01100011110000	-2		72	10001100011100	-2
	73	01100011100001	-2		73	10001100110001	-2
	74	01100011001100	-2		74	10001100111000	-2
	75	011000110000110	-2		75	10001110000011	-2
	76	011000110000011	-2		76	100011100000110	-2
	77	01100001111000	-2		77	10001110001100	-2
	78	01100001110001	-2		78	10001110011000	-2
	79	01100001100110	-2		79	10001111000001	-2
	80	01100001100011	-2		80	10001111100000	-2
	81	01100000111100	-2		81	10011000000111	-2
2 (C)	82	01100000111001	-2		82	10011000001110	-2
	83	01100000110011	-2		83	100110000011001	-2
	84	01100000111100	-2		84	100110000011100	-2
	85	01100000001111	-2		85	100110000110001	-2
	86	011000000111000	-6		86	10011000111000	-2
	87	00111100000001	-6		87	10011001100001	-2
	88	00111001100000	-4		88	10011001110000	-2
	89	00111000110000	-4		89	100111000000011	-2
	90	00111000011000	-4		90	10011100000110	-2
	91	00111000001100	-4		91	100111000001100	-2
	92	00111000000110	-4		92	10011100011000	-2
	93	00111000000011	-4		93	10011100110000	-2
	94	00110011100000	-4		94	10011110000001	-2
	95	00110011000001	-4		95	10000000110011	-4
	96	00110001110000	-4		96	10000000111001	-4
	97	00110001100001	-4		97	10000000111100	-4
	98	00110000111000	-4		98	10000000110001	-4
2 (D)	99	00110000110001	-4		99	10000002100110	-4
	100	00110000011100	-4		100	100000001110001	-4
	101	001111000011001	-2		101	10000000111000	-4
	102	00111100110000	-2		102	100000011000011	-4
	103	001111000110000	-2		103	100000011000110	-4
	104	00111100001100	-2		104	100000011001100	-4
	105	00111100000110	-2		105	100000011100001	-4
	106	00111100000011	-2		106	100000011110000	-4
	107	00111001110000	-2		107	100001100000011	-4
	108	00111001100001	-2		108	100001100000110	-4
	109	00111000111000	-2		109	10000110001100	-4
	110	00111000110001	-2		110	10000110011000	-4
	111	00111000011100	-2		111	10000111000001	-4
	112	001110000011001	-2		112	10000111100000	-4
	113	001110000001110	-2		113	100011000000011	-4
	114	001110000000111	-2		114	100011000000110	-4
2 (E)	115	00110011110000	-2		115	100011000001100	-4
	116	00110011100001	-2		116	10001100011000	-4
	117	00110011001100	-2		117	10001100110000	-4
	118	00110011000110	-2		118	100011100000001	-4
	119	00110011000011	-2		119	100110000000011	-4
	120	00110001111000	-2		120	100110000000110	-4
	121	001100001110001	-2		121	100110000001100	-4
	122	001100001100110	-2		122	10011000011000	-4
	123	001100001100011	-2		123	100110001100000	-4
	124	00110000111100	-2		124	100110011000000	-4
	125	001100001100001	-2		125	100111000000001	-4
	126	001100001100011	-2		126	100000000111000	-6
	127	00110000011110	-2		127	1000000001110000	-6
	128	001100000011111	-2		128	10000000011100000	-6
	129	001111111100000	0		129	110000000111111	0
	130	001111111000001	0		130	110000000111110	0
	131	001111110011000	0		131	110000001100111	0
	132	001111110001100	0		132	1100000001110011	0

Tableau 18 (CDS < 0)

5	Classe	Données à 8 bits	Codes de modulation commençant par "0"	CDS	Classe	Données à 8 bits	Codes de modulation commençant par "1"	CDS
10	2 (C)	133	00111110000110	0	133	11000001111001	0	0
		134	00111110000011	0	134	11000001111100	0	0
		135	00111100111000	0	135	11000011000111	0	0
		136	00111100110001	0	136	11000011001110	0	0
		137	00111100011100	0	137	11000011100011	0	0
		138	00111100011001	0	138	11000011100110	0	0
		139	00111100001110	0	139	11000011110001	0	0
		140	00111100000111	0	140	11000011111000	0	0
		141	00111001111000	0	141	11000110000111	0	0
		142	00111001110001	0	142	11000110001110	0	0
		143	00111001100110	0	143	11000110011001	0	0
		144	00111001100011	0	144	110001100011100	0	0
		145	00111000111100	0	145	11000111000011	0	0
		146	00111000111001	0	146	11000111000110	0	0
		147	00111000110011	0	147	11000111001100	0	0
		148	00111000011110	0	148	11000111100001	0	0
		149	00111000011111	0	149	11000111110000	0	0
		150	00110011111000	0	150	11001100000111	0	0
		151	00110011110001	0	151	11001100001110	0	0
		152	00110011100110	0	152	11001100011001	0	0
		153	00110011100011	0	153	11001100011100	0	0
		154	00110011001110	0	154	11001100110001	0	0
		155	00110011000111	0	155	11001100011100	0	0
		156	00110001111100	0	156	11001110000011	0	0
20	2 (D)	157	00110001111001	0	157	110011100000110	0	0
		158	00110001110011	0	158	11001110001100	0	0
		159	00110001100111	0	159	110011100011000	0	0
		160	00110000111110	0	160	11001111100001	0	0
		161	00110000011111	0	161	11001111100000	-2	0
		162	001100000111001	-2	162	11000000011110	-2	0
		163	00110000001110	-2	163	110000000110011	-2	0
		164	00110000001111	-2	164	110000000111001	-2	0
		165	00011110000001	-4	165	11000000111100	-2	0
		166	00011100110000	-4	166	11000001100011	-2	0
		167	00011100011000	-4	167	11000001100110	-2	0
		168	00011100001100	-4	168	11000001110001	-2	0
		169	00011100000110	-4	169	11000001111000	-2	0
		170	00011100000011	-4	170	110000011000011	-2	0
35	3 (C)	171	00011001110000	-4	171	110000110000110	-2	0
		172	00011001100001	-4	172	11000011001100	-2	0
		173	00011000111000	-4	173	110000111000001	-2	0
		174	00011000110001	-4	174	11000011110000	-2	0
		175	00011000011100	-4	175	110001100000011	-2	0
		176	00011000011001	-4	176	11000110000110	-2	0
		177	00011000001100	-4	177	11000110001100	-2	0
		178	00011000000111	-4	178	11000110011000	-2	0
		179	00011111100000	-2	179	110001110000001	-2	0
		180	00011111000001	-2	180	11000111100000	-2	0
		181	00011110011000	-2	181	110011000000011	-2	0
		182	00011110001100	-2	182	11001100000110	-2	0
		183	00011110000110	-2	183	11001100001100	-2	0
		184	00011110000011	-2	184	11001100011000	-2	0
45	3 (D)	185	00011100111000	-2	185	11001100110000	-2	0
		186	000111000110001	-2	186	110011100000001	-2	0
		187	00011100001100	-2	187	110000000110001	-4	0
		188	000111000011001	-2	188	11000000011100	-4	0
		189	000111000001110	-2	189	1100000001110001	-4	0
		190	000111000000111	-2	190	1100000001110000	-4	0
		191	00011001111000	-2	191	110000001100001	-4	0
		192	00011001110001	-2	192	1100000011100000	-4	0
		193	00011001100110	-2	193	1100000011000001	-4	0
		194	000110011000111	-2	194	1100000011100000	-4	0
50	3 (E)	195	00011000111100	-2	195	11000110000001	-4	0
		196	000110001110001	-2	196	110011000000001	-4	0
		197	000110001100111	-2	197	110000000110000	-4	0
		198	00011000011110	-2	198	1100000001100000	-4	0
		199	000110000011111	-2	199	11000000011000000	-4	0

Tableau 18 (CDS ≤ 0)

	Classe	Données à 8 bits	Codes de modulation commençant par "0"	CDS	Classe	Données à 8 bits	Codes de modulation commençant par "1"	CDS
10	3 (C)	200	00011111110000	0		200	111000000001111	0
		201	000111111100001	0		201	111000000111110	0
		202	00011111001100	0		202	111000001100111	0
		203	000111110000110	0		203	111000001110001	0
		204	000111110000011	0		204	111000001111100	0
		205	00011110011100	0		205	111000001100011	0
		206	000111100110001	0		206	111000001100110	0
		207	00011110001110	0		207	111000001110001	0
		208	000111100001111	0		208	111000001111000	0
		209	000111001111100	0		209	111000001100011	0
		210	000111001110001	0		210	111000001100110	0
		211	000111001100111	0		211	111000001100110	0
		212	000111000111110	0		212	111000001110001	0
		213	000111000111111	0		213	111000001111000	0
		214	00011001111100	0		214	111001100000111	0
		215	000110011111001	0		215	111001100001110	0
20	3 (D)	216	000110011100111	0		216	11100110001100	0
		217	000110011001111	0		217	111001100110000	0
		218	000110001111110	0		218	111001100000011	0
		219	000110001111111	0		219	111001111000000	0
		220	00001111110000	-2		220	11100000001110	-2
		221	00001111000001	-2		221	11100000011001	-2
		222	0000111001100	-2		222	11100000011100	-2
		223	0000111000110	-2		223	11100000110001	-2
		224	00001110000011	-2		224	11100000111000	-2
		225	00001110011100	-2		225	11100000110001	-2
		226	00001110011001	-2		226	11100000110000	-2
		227	00001110001110	-2		227	11100011000001	-2
		228	00001110000111	-2		228	11100011100000	-2
		229	000011001111100	-2		229	11100111000001	-2
		230	000011001111001	-2		230	11100000001100	-4
		231	00001100110011	-2		231	11100000011000	-4
		232	00001100011110	-2		232	11100000110000	-4
		233	00001100011111	-2		233	11100001100000	-4
30	4 (C)	234	00001111111000	0		234	11110000000111	0
		235	00001111110001	0		235	11110000001110	0
		236	00001111100110	0		236	111100000011001	0
		237	00001111100011	0		237	11110000011100	0
		238	00001111100110	0		238	111100000110001	0
		239	000011111000111	0		239	111100000111000	0
		240	00001110011110	0		240	1111000001100001	0
		241	00001110011111	0		241	111100011100000	0
		242	00001100111110	0		242	111100111000001	0
		243	00001100111111	0		243	111100111100000	0
		244	000001111111000	-2		244	11110000000110	-2
		245	000001111100011	-2		245	11110000001100	-2
		246	000001111001110	-2		246	111100000011000	-2
		247	000001110001111	-2		247	111100000110000	-2
		248	000001100011111	-2		248	111100011000000	-2
40	5 (C)	249	00000111111100	0		249	11111000000111	0
		250	000001111111001	0		250	111110000001110	0
		251	0000011111110011	0		251	111110000001100	0
		252	0000011111000111	0		252	11111000011000	0
		253	0000011100011111	0		253	111110000110000	0
		254	0000011001111111	0		254	111110011000000	0
		255	000000111111110	0		255	111111000000011	0
		256	000000111111111	0		256	111111000000010	0
		257	0000001111111111	0		257	111111000000001	0
		258	00000011111111111	0		258	111111000000000	0
		259	000000111111111111	0		259	1111110000000001	0
		260	0000001111111111111	0		260	1111110000000000	0
		261	00000011111111111111	0		261	11111100000000001	0
		262	000000111111111111111	0		262	11111100000000000	0
		263	0000001111111111111111	0		263	111111000000000001	0
45	6 (C)	264	00000011111111111111111	0		264	1111110000000000011	0
		265	000000111111111111111111	0		265	11111100000000000110	0
		266	0000001111111111111111111	0		266	111111000000000001100	0
		267	00000011111111111111111111	0		267	1111110000000000011000	0
		268	000000111111111111111111111	0		268	11111100000000000110000	0
		269	0000001111111111111111111111	0		269	111111000000000001100001	0

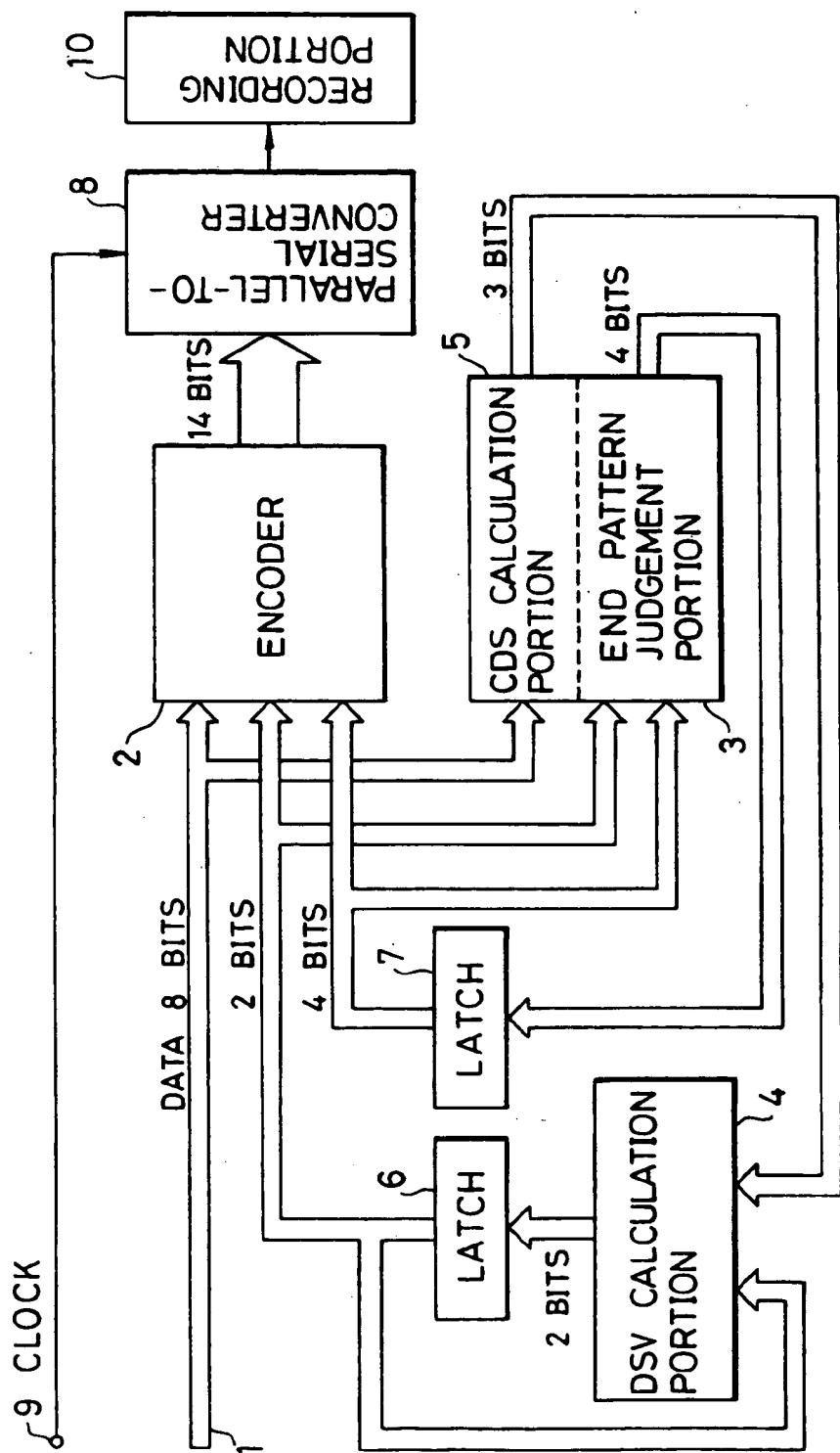


FIG. 1

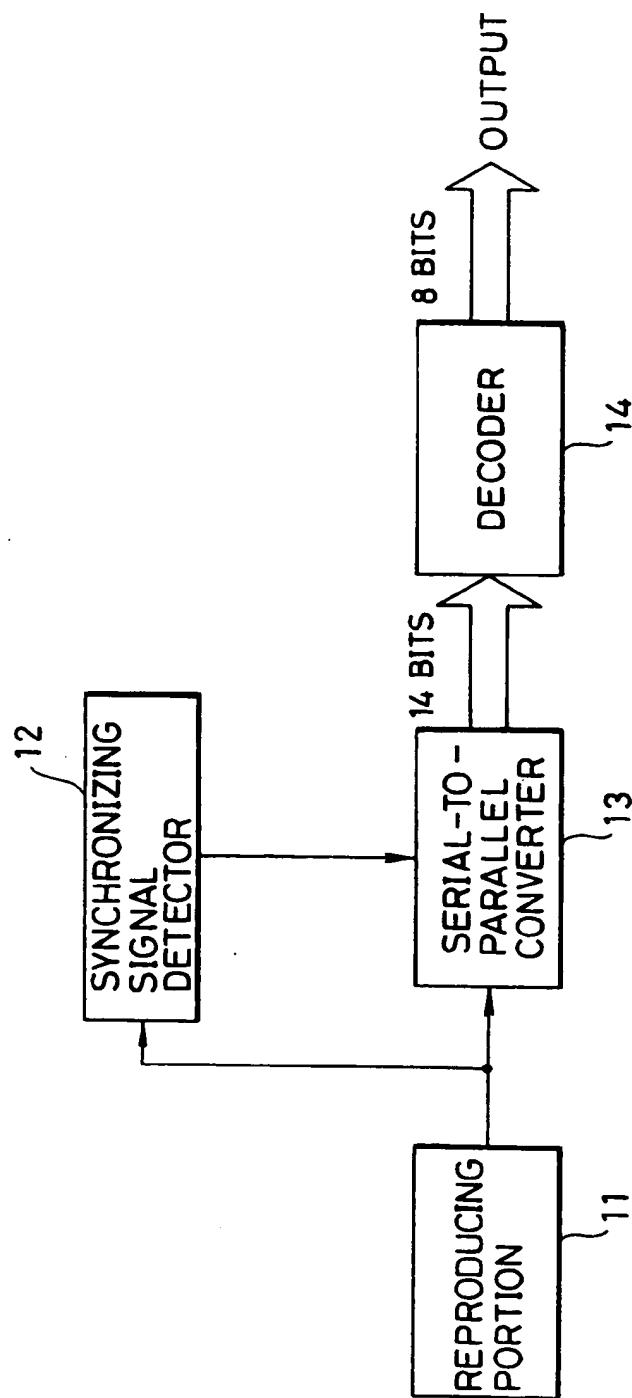


FIG. 2

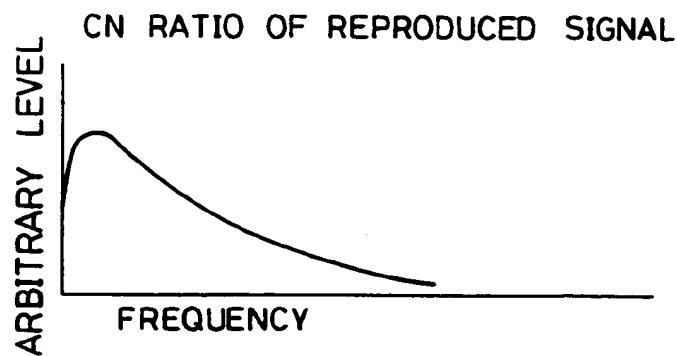


FIG. 3A

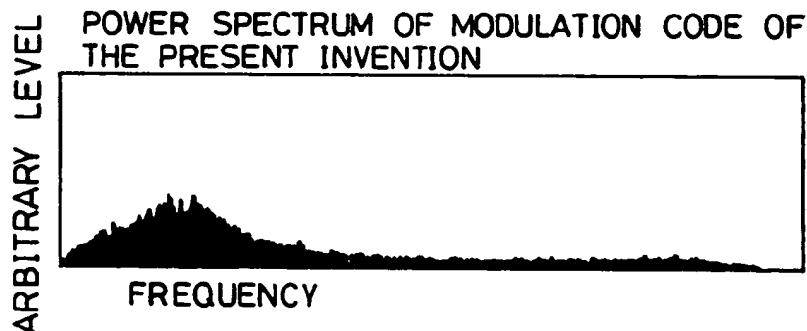


FIG. 3B

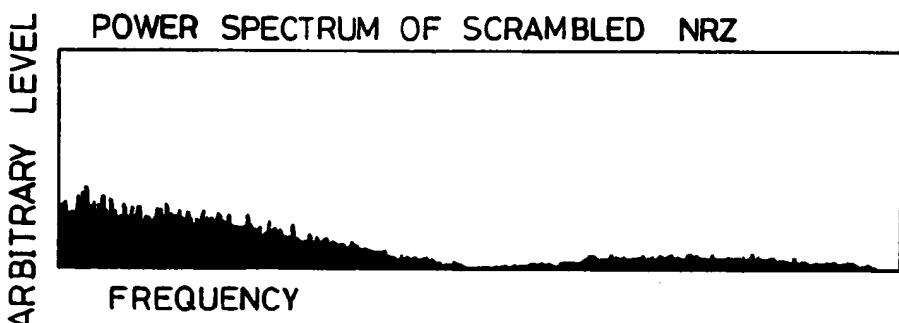


FIG. 3C

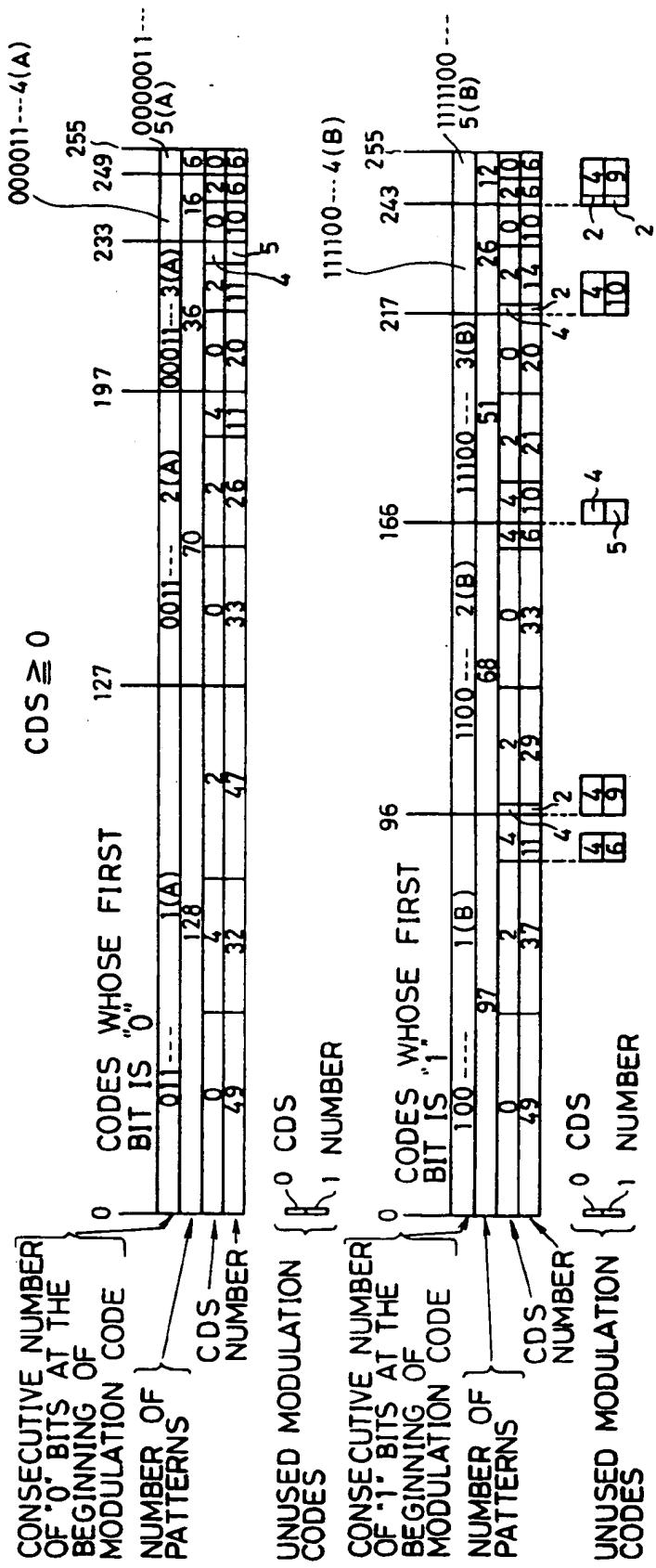
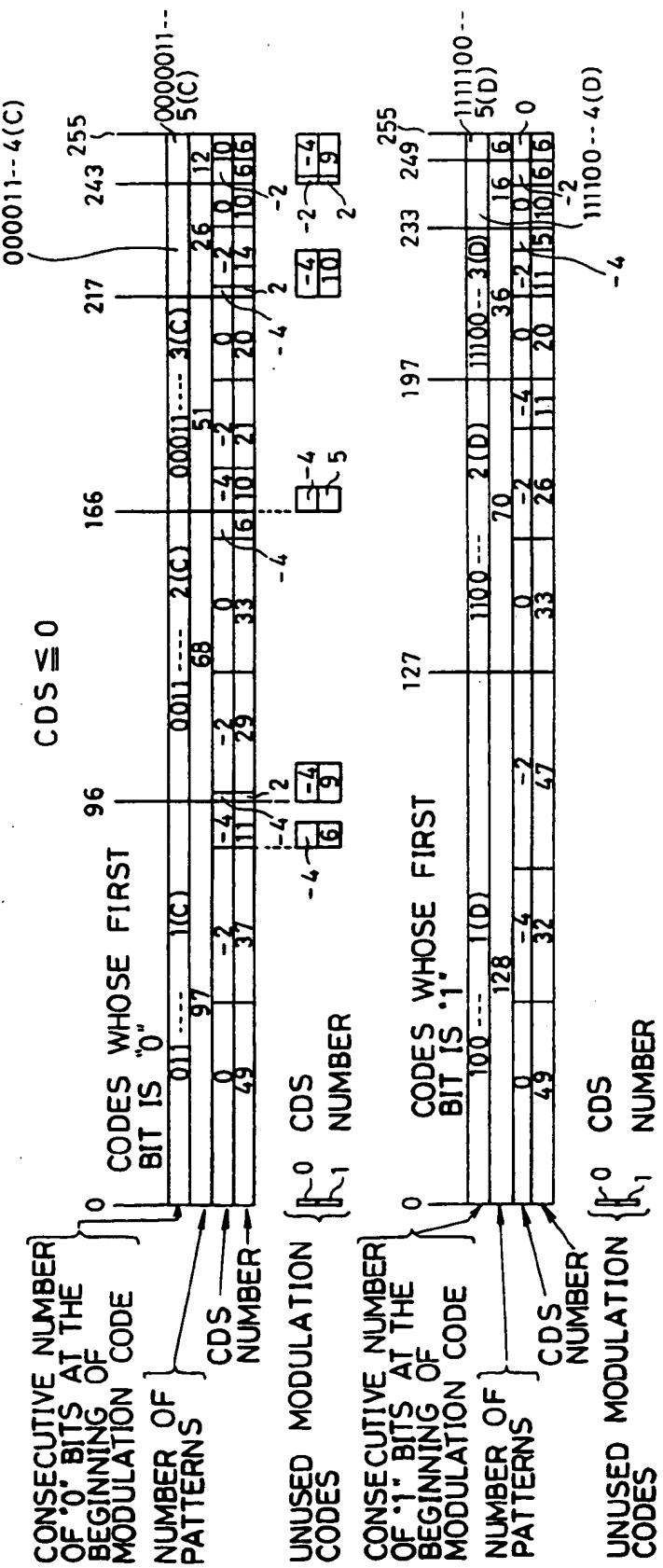


FIG. 4



5.
FIG.
E

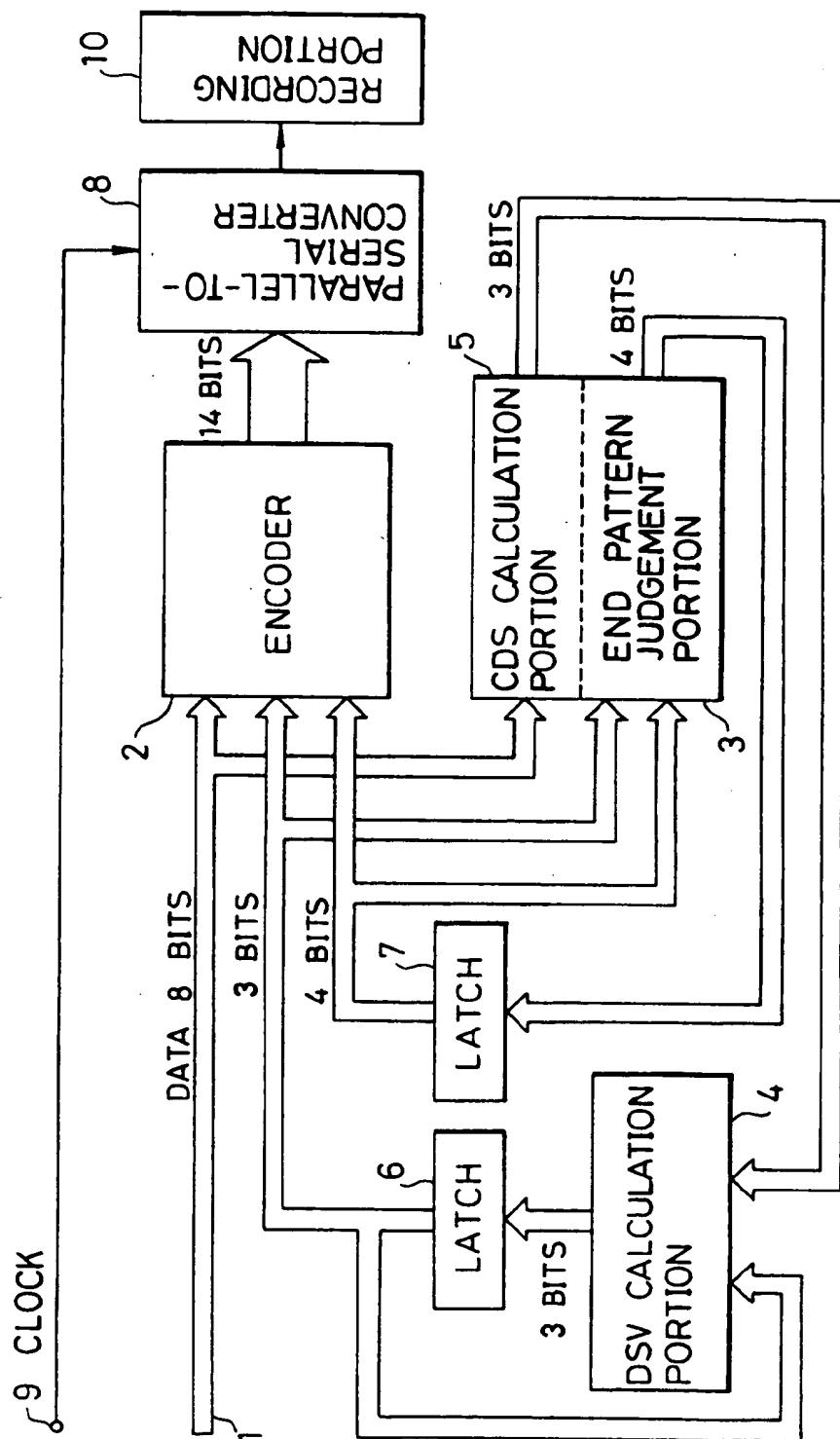


FIG. 6

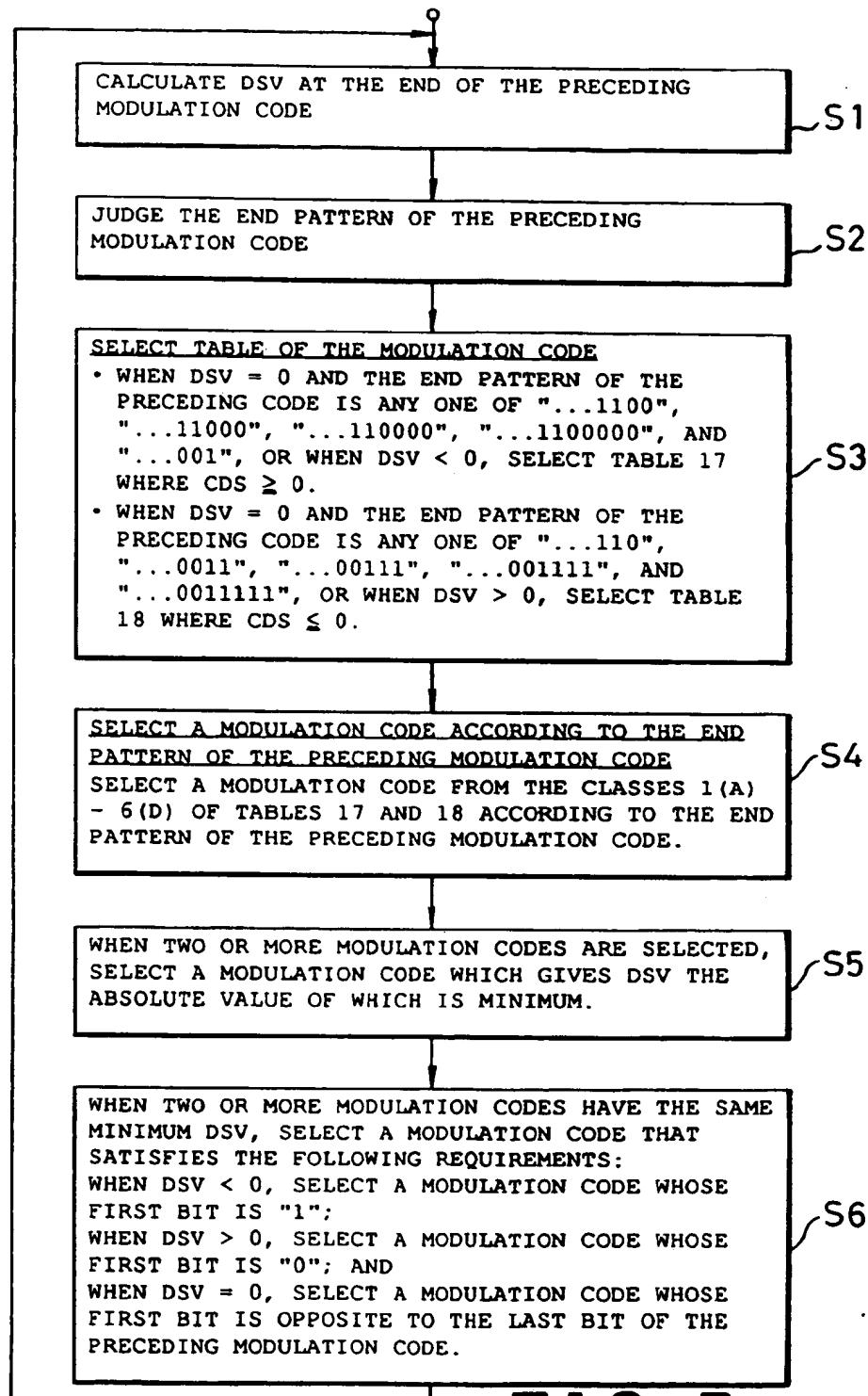
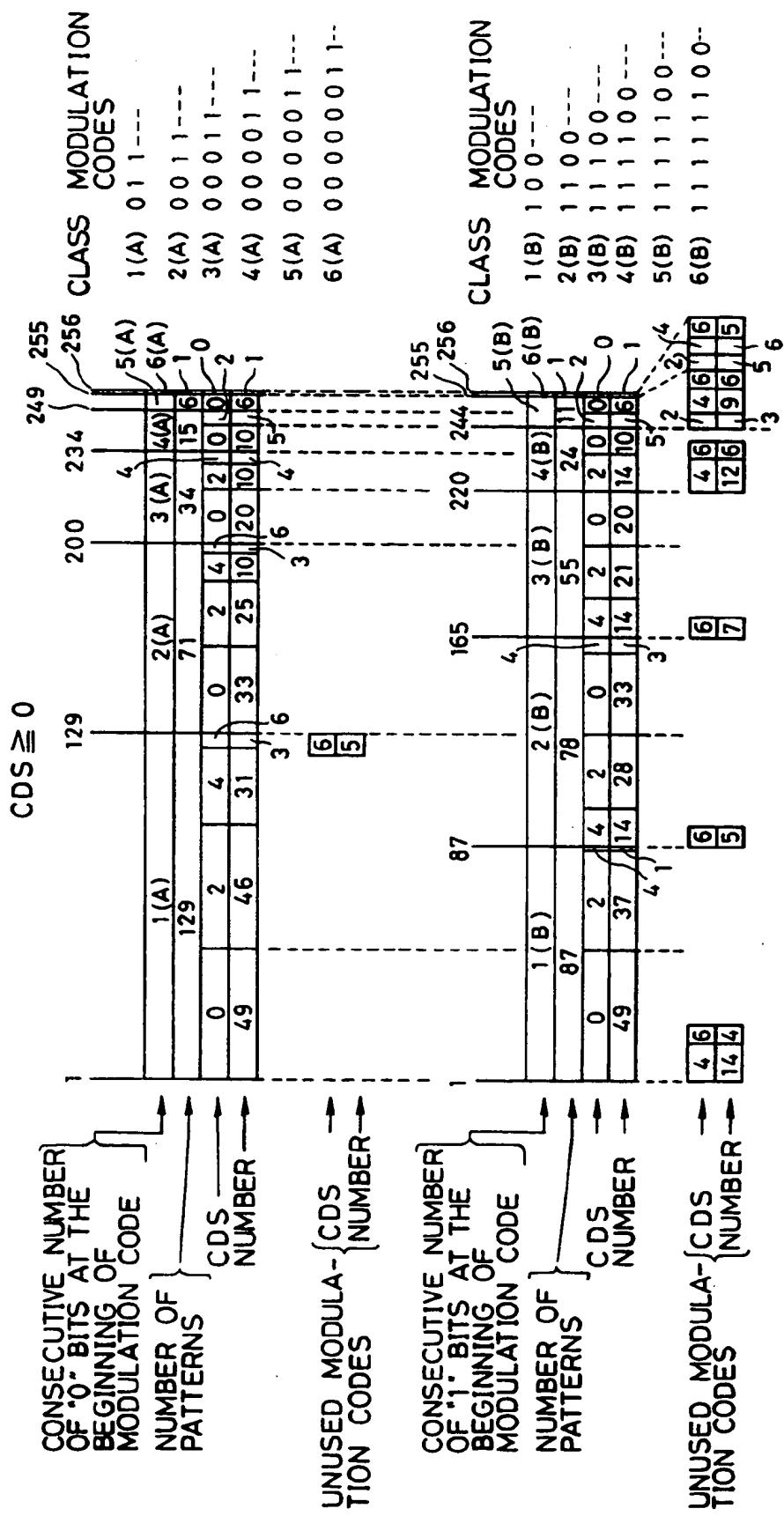
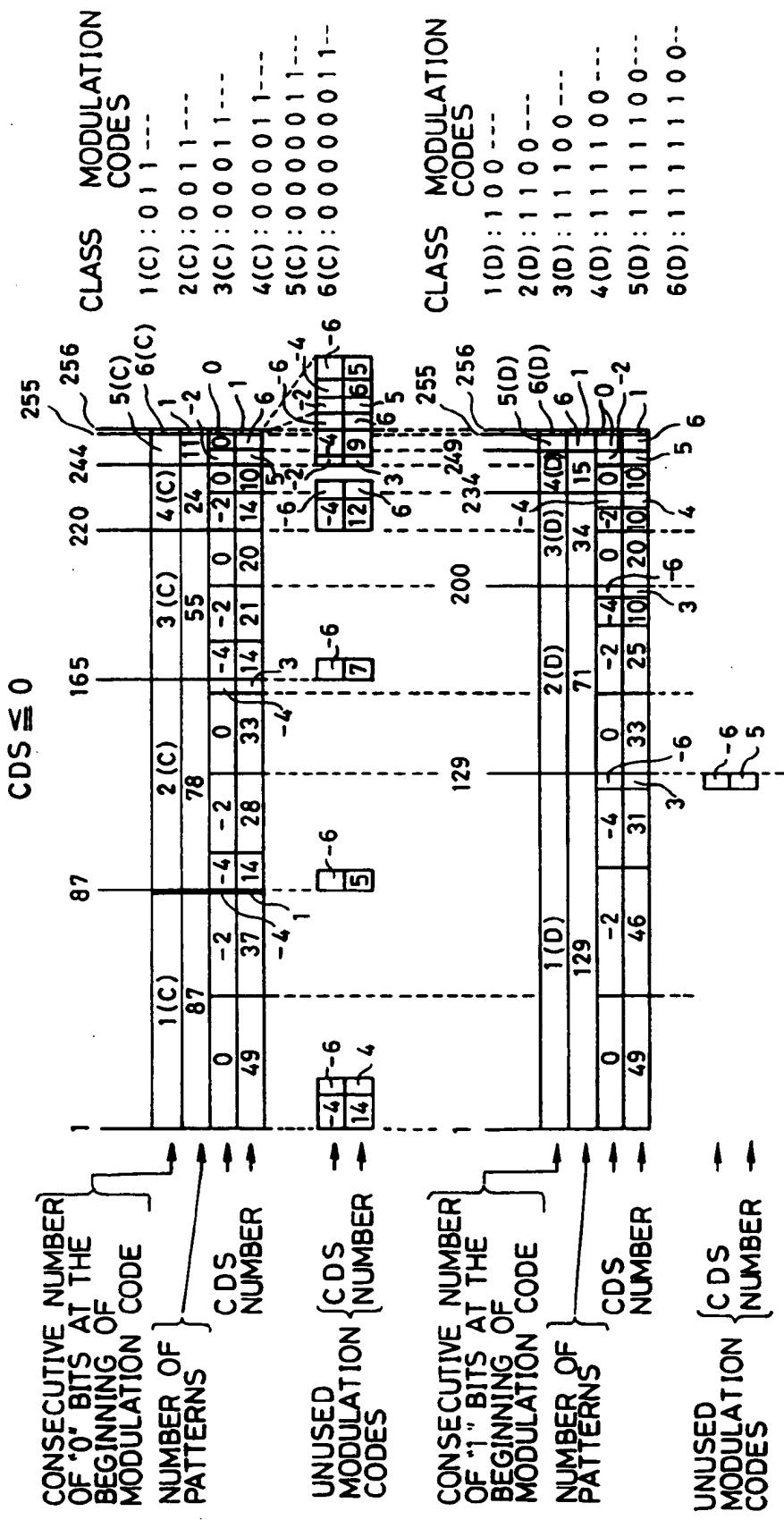


FIG. 7





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